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ELECTRIC RAILWAY TRACTION

A Supplement illustrating and describing developments in Electric Railway Traction is presented with each copy of this week's issue.

The Viceroy of India and Railways

THE new Viceroy's address, when he opened the session of the Indian Railway Conference Association at Delhi the other day, was refreshingly apposite, and showed a keen interest in and knowledge of the Indian railways; a summary of it will be found in our Overseas columns on page 973. His appreciation of their value both in the development of the country and at the present time is little less warm than his commendation of the recent reduction of working expenses on State-owned lines by nearly £5,000,000 a year, to which we have already referred editorially on a previous occasion. But what specially appeals to us in His Excellency's address is its urgent demand for many of the latest forms of revenue-producing enterprise in railways, such as greater speed, comfort and general efficiency, as all tending to make railways more attractive and give the public what it wants, especially in the face of keen competition from other forms of transport. He went so far as to stress the need for speeding up both passenger and goods services and the provision of more comfortable third class coaching stock for the masses. At the same time he showed a realisation of the fact that active steps were already being taken towards the latter, towards air-conditioning in certain trains, and also—as a result of scientific tests—towards reduction of renewal expenditure by running heavier and faster trains over existing bridges and permanent way. In fact, the address showed a welcome realisation of the needs of the railway situation in India today.

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Good Will and Efficiency

"There can be no harmony in industrial relations without good will on both sides," said Dr. K. G. Fenelon, Director of the Department of Industrial Administration, Manchester University, when lecturing on December 4 to the Leeds and District Section of the Institute of Transport. For efficiency harmony is necessary, therefore the promotion of good will is an essential step to industrial efficiency. Dr. Fenelon discussed the complicated relations that now exist between employers and employees in the great transport industries, and outlined some of the elaborate measures taken with the object of minimising friction in the human part of industrial machinery. With more square than round pegs in round holes, the picture conjured up is almost Heath Robinsonian in comparison with that of the inanimate part of the industrial machine in which everything is designed with the utmost care to fit exactly so as to perform its allotted function with the least friction. For the most efficient working of industry, it is necessary to permit the human individuals whose energy cannot be replaced by machines to have the maximum freedom of choice to select the kind of work which they enjoy doing. Nothing promotes good will better than congenial work. Nothing is more likely to kill it than the present necessity to take an uncongenial job if it is the first that offers.

* * * *

The Week's Traffics

A total increase of £136,000 is shown in the traffics of the four group companies for the past week, against a net decrease of £45,000 in the previous week. Merchandise earnings are up £89,500, and passenger train receipts improved by £47,000. Coal traffics are £500 down in contrast with a net increase of £23,500 in the corresponding week of 1935. For the year to date the traffics of the four companies aggregate £147,058,000, an increase of £4,518,000, or 3·17 per cent. Passenger train receipts for the 49 weeks show the following increases:—L.M.S.R. £620,000, or 2·63 per cent.; L.N.E.R. £324,000, or 2·10 per cent.; G.W.R. £217,000, or 2·17 per cent.; and Southern £311,000, or 2·12 per cent. In merchandise earnings the gain of the L.M.S.R. is 5·78 per cent., L.N.E.R. 3·32 per cent. and G.W.R. 4·35 per cent.

	49th Week				Year to date	
	Pass., &c.	Goods, &c.	Coal, &c.	Total	Inc. or Dec.	
	£	£	£	£	£	%
L.M.S.R. ..	+ 21,000	+ 31,000	— 3,000	+ 49,000	+ 2,263,000	+ 3·95
L.N.E.R. ..	+ 8,000	+ 30,000	+ 4,000	+ 42,000	+ 1,231,000	+ 2·93
G.W.R. ..	+ 10,000	+ 19,000	— 4,000	+ 25,000	+ 627,000	+ 2·62
S.R.	+ 8,000	+ 9,500	+ 2,500	+ 20,000	+ 397,000	+ 2·07

On the Mersey Railway the increase for the week is £351 and for the year to date £4,054.

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Pullman Car Results

An improvement of £14,215 in traffic receipts of the Pullman Car Co. Ltd. during the year ended September 30, 1936, was largely offset by an increase in working expenses of £13,257 caused mainly by the rise in the price of foods and the increased movement of rolling stock. Passengers increased in number from 1,159,847 to 1,182,954, and there was a welcome, though small, improvement from £44,197 to £46,170 in the receipts from Continental boat train passengers, who numbered 92,711, against 88,930 in the previous year. After meeting all

charges, providing £38,965 for depreciation, allocating £8,532 to reserve for loss on sale of Irish cars, and £14,296 for the 3 per cent. dividend on preference shares on account of arrears, the balance to be carried forward is £22,641, against £26,667 brought in.

	1935–36	1934–35
	£	£
Gross receipts	270,935	256,720
Working expenses..	197,798	184,541
Net receipts	73,137	72,179

The contract with the Great Southern Railways of Ireland on approaching termination was not renewed and the four cars concerned have been sold to that company. These cars were owned through a subsidiary, Irish Pullmans Limited, which is being liquidated.

* * * *

The Travelling Post Office Service

More than seven thousand million letters are posted annually in Great Britain and Northern Ireland, and the Post Office has the task of delivering them as expeditiously as possible. Trains, motor vans, and aeroplanes are employed in the transport of mails, but the great bulk of the mails is carried on the railways; indeed, the Post Office is believed to be the largest single customer of the railway companies in regard to the total sum paid for traffic handled. A vast detailed organisation is necessary to provide for the expeditious delivery of letters to every house in the country, and an indispensable feature of the system is the travelling post office, which formed the subject of an interesting paper presented on December 3 to the Railway Students' Association by Mr. J. J. C. Rowden, Chief Superintendent, Travelling Post Offices, of which we give a précis on page 988. Some T.P.O. trains are run specially for Post Office purposes alone, while others are called " controlled " trains—that is to say, the contracts between the Post Office and the railway companies provide that certain trains used for the conveyance of mails and T.P.O. carriages shall be run according to Post Office requirements, and may not be altered without the agreement of the Post Office. The Post Office, of course, pays for this, as it pays for all other services rendered by the railway companies. The relations of the Travelling Post Office Service with the Operating and Engineering Departments of the railway companies are necessarily frequent and intimate, and their cordial character was aptly summarised by Mr. Rowden who said " the friendly and helpful spirit in which we are met makes our business a pleasure."

* * * *

Level Crossing Casualties in U.S.A.

During the first six months of this year 634 motor drivers drove their vehicles into the sides of trains passing over level crossings in the United States, and another 1,085 collisions resulted from drivers crossing in front of approaching trains. From the statistics issued by the Interstate Commerce Commission the fact emerges that it is passenger vehicles, private and commercial, which are most often involved in these casualties. The speed of the train seems to have little connection with these collisions, as the largest proportion, 23·91 per cent., occurred when the train was moving at between only 1 and 9 m.p.h., and 6·92 per cent. when the train was at a standstill! Most significant is the fact that the greatest number of these crashes occur during the last hour before midnight on Saturdays. No doubt the reproaches of the righteous, coupled with intensive instruction in proper driving, will in time reduce this type of casualty, but the most effective thing would be to abolish the prime cause, and build bridges.

Rush-Hour Relief

Availability outwards only after the worst of the morning rush is over, is a familiar condition of cheap tickets from suburban stations to large towns. Usually, however, return is allowed by any train, and so evening services already laden with office workers are invaded by returning shoppers who have deferred their homecoming until the last possible moment. In Great Britain, an appeal to passengers who can do so to avoid the rush hours has recently been issued by the London Passenger Transport Board in the shape of a poster by the well-known humorous artist, " Fougasse." The Victorian Government Railways have adopted what may be a still more effective form of persuasion to users of the Melbourne suburban electric services, by issuing special cheap return tickets stipulating return not later than 4.30 p.m. In this country, very cheap evening returns to town are already issued from suburban stations near London, and the extension of the principle to daytime travellers upon the principles operative in the Melbourne area merits consideration. It might assist in stimulating the hoped-for extra patronage between rush hours of the L.N.E.R Liverpool Street suburban services, when these are electrified.

* * * *

A New Hiawatha

It is symptomatic of the success of high speed transport in America that the Hiawatha of the Chicago, Milwaukee, St. Paul & Pacific, which began its career eighteen months ago as a six-car train, has now blossomed out into an entirely new nine-car formation of the most up-to-date streamlined stock. Three luxurious parlour cars and four very comfortable coaches provide between them 284 seats; and in addition a dining car and a buffet car—the latter forming part of the " express " car at one end of the train—complete the formation. No alteration has been made in the schedule, and the large streamlined Atlantic locomotives specially built for the service still handle the train, despite its increase in weight. The average speed demanded by the booking rises, between two timing points on the Chicago-Milwaukee section of the run, to 90 m.p.h., and maximum speeds up to and slightly exceeding 100 m.p.h. are not uncommon. Not only has the Hiawatha thus added considerably to its popularity, but The 400 of the competing Chicago & North Western route is heavier than when first instituted, while the Chicago, Burlington & Quincy's Zephyr service has long since expanded to two daily runs in each direction between Chicago and the Twin Cities of St. Paul and Minneapolis. Experience has been similar in this country with the Silver Jubilee of the L.N.E.R., which judging by average applications for seating could well do with additional accommodation; and the recent dynamometer experiments seemed to prove that one extra third class coach at least could be run in the set without causing much concern to the streamlined Pacifics that work the train.

* * * *

Catering for Railroad Fans

No one could complain that in recent years the British railway " fan " has been neglected by the railways locomotives works excursions. Inexpensive literature, and various other means have been successfully used to add fuel to the flame of his interest, which in earlier years was often looked upon by the authorities as a nuisance rather than as a possible asset. But news from the United States shows that some of the methods now adopted by American railroads to turn to profitable account the leanings of American railroad enthusiasts go considerably further than our own. Early in October, for example, the

Pennsylvania, in conjunction with the railway and Locomotive Historical Society, organised a round trip of 350 miles that was a most ingenious blend of the scenic, the historical, the railway operating side, the locomotive interest, and last, but certainly not least, high speed. Detailed itineraries were supplied to each of the 472 passengers; two stops were made to enable the photographers, who numbered one-third of the passenger complement, to secure records of locomotives to their hearts' desire, including a parade of engines specially drawn up at Fort Wayne engine sheds for the purpose; and finally, in charge of two of the most powerful Pennsylvania Pacific locomotives, the train was whisked over the 141 miles from Fort Wayne to Englewood, Chicago, in 112 minutes, at a start-to-stop speed of 75·5 m.p.h.—3 min. faster than the schedule of the Detroit Arrow, the world's fastest steam train. It is small wonder that the enthusiasm over this enterprise was so great that even 15 Pennsylvania employees paid the full fare of $3·50 to participate in it.

* * * *

Detecting Dragging Equipment

The Delaware, Lackawanna & Western, and the Pennsylvania Railroads have been experimenting during the last year or two with track apparatus to detect equipment dragging from passing vehicles, especially freight vehicles, liable to damage points, crossings, and other fittings at interlocking plants. The basic principle of both devices is that whatever is dragging breaks something forming part of a signal control circuit, causing a danger signal to be exhibited far enough ahead of the train for the driver to stop before damage can be done. An interesting modification of this principle is used on those sections of the Pennsylvania equipped with continuous cab signalling, as described in our issue of March 22, 1935. The destruction of the detector does not put the signal ahead to " stop " but to " caution "—or " approach " as it is termed in America—although the cab signal assumes its most restrictive aspect. This discordance indicates to the driver what is wrong and allows the ground apparatus to be put nearer to the interlocking limits without fear of a " stop " indication being shown right in front of him, involving an unnecessary emergency brake application. Without the cab signal, of course, the detector must be far enough out to allow of an " approach " indication being shown in rear of the emergency " stop " indication. These devices, now in regular service at several places, are fully described in *Railway Signaling* for November, 1936.

* * * *

Increased Railway Orders in America

Our contemporary the *Railway Age* in a recent issue reported a general improvement in the demand for railway equipment, stating that twice as many locomotives, freight and passenger vehicles have been ordered this year as in 1935, whilst rail orders up to the end of October represent an aggregate tonnage one-third greater than that placed last year. During the month of October orders for 22 locomotives were given out, bringing this year's 10-months total to 180 as compared with a total of 83 for the whole of 1935, the increase in both cases being exclusive of power units for streamlined trains. With the October orders for 1,310 freight wagons, the 1936 total reached 38,664, whilst the current year's business in the export market for the same classes of vehicles is in the same relative position, the 1936 orders, for 516 cars, representing a better export volume than that of any year since 1930, with the exception of 1934. During October this year, orders for five passenger train coaches constituted the first business reported in this field since July, the total for the year being now 146 cars, exclusive of articulated units for streamlined trains. Rail orders in the same month aggregated 110,237 tons, the largest volume of any month with the exception of January and February. The 1936 10-months total of 662,822 tons compares with the 495,300 tons placed throughout 1935.

* * * *

New Rolling Stock in Germany

During a recent visit to Germany, in the course of which we travelled on several different sections of the Reichsbahn, certain aspects of the organisation, and the reaction of the German travelling public to them, provided scope for interesting observation. The new first and second class coaches, together with some existing stock in which the interior appointments have alone been altered, are quite keenly competed for by passengers, and there has been a marked increase in the reserved seat business since this stock was introduced. The wider seats and more attractive style of upholstery and interior appointments generally, including double sliding doors and larger windows on the corridor side, together with improved means of operating the windows on the other side of the coach, represent a considerable improvement on the previous standards, good as the latter undoubtedly were. We were particularly impressed by the very smooth riding of the coaches, tribute alike to the efficient springing and the excellence of the permanent way.

* * * *

Popularity of FD Trains

A further observation during our recent German travels was the increased patronage of the FD, as compared with the D trains, the former, despite the supplementary charge of 2 RM. second class and 3 RM. first, being often filled to capacity, whilst the ordinary corridor train running between the same points had room to spare in plenty. One particular instance of this was the FD 24 train leaving Berlin (Lehrter Bahnhof) at 6.15 p.m. for Hamburg, a train of very heavy loading which is allowed 144 minutes for the run of 178·1 miles without an intermediate stop, giving an average speed of 74·2 m.p.h. This train, which was practically full from end to end, was hauled by the Borsig streamlined engine and improved on its schedule by nearly 3 minutes. The D66 train standing alongside it in the Berlin terminal station and leaving at 6.20—five minutes after the other—is allowed 3 hr. 24 min. with three intermediate stops, the time being thus exactly one hour more than in the case of the FD. This train was barely half full when it left, in spite of the additional points served.

* * * *

Geography Lessons By Train

Loudspeaker equipment in railway carriages has already been used for instructional purposes on the Continent, as for example in the Belgian *Train Radio Scolaire,* school excursionists in which are provided with a running commentary on places of interest passed. Similar facilities are now proposed for Austria, where the State Railways are offering to place such trains at the disposal of schools. Each train will consist of ten carriages for the pupils, each fitted with a loudspeaker, and a carriage for teachers fitted with a microphone. The teacher in charge will make comments on the passing scenery during the journey. If desired the train will stop at any station, and instructional tours will be made on foot. Accommodation will be provided for 650 children, and it is stated that the fares will work out at the equivalent of 10d. from London to Brighton and back. It is hoped that the children will be encouraged to take an interest in their country, and will become regular travellers by train.

XUM

A Notable Station Centenary

ON December 14, 1836, was opened London's first main-line station, which later became the busiest station in the metropolis. The presence of the Lord Mayor, 2,000 ladies and gentlemen, and the Scots "Fusileer" band were needed on the fateful day in order to still the imprecations of the Greenwich travellers, who for ten long months had had to tramp out to the temporary station at Spa Road. Even before its opening as the terminus of the London & Greenwich Railway, London Bridge station was envisaged as a regular starting point for main-line trains to Sussex and Kent via the Croydon and Greenwich routes. But this foresight led neither to a well-planned station nor to a smooth-working organisation, and as traffic grew the station formed an apt example of the adage, "the jointer the worser." The London & Croydon Railway trains began to run into the Greenwich company's station in 1839, but having anticipated a lack of accommodation the London & Croydon had obtained powers three years before to build a station of its own alongside the London & Greenwich terminus. Surprisingly, the Croydon station was situated to the *north* of the Greenwich platforms, and when in 1842 the two tracks from the stations to Corbett's Lane junction were quadrupled, the Croydon and Greenwich trains had to cross each other's paths. The two companies therefore exchanged stations, and a joint committee of the Brighton, Croydon, and South Eastern lines (all interested because their main-line trains ran into it) was formed to manage a new joint station building on the site of the ex-Greenwich station.

Three years later, in 1845, the London & Greenwich Railway was leased to the South Eastern, but although this gave more unified control over the combined stations it did not render the relations between the partners more amicable. The line to Corbett's Lane was widened again by the South Eastern in 1847-50, after powers granted in 1845 had been allowed to lapse. These lapsed powers included provision for the installation of atmospheric apparatus for the London & Croydon proposals to suck travellers from one terminus to the other. Station enlargement works were put in hand at the same time as the widening, but the London Brighton & South Coast Railway (an amalgamation in 1846 of the London & Brighton and the London & Croydon), being dissatisfied with the allocation of the station accommodation and the method of working the traffic, decided to build its own terminus to the south of the joint property, and this station was opened in 1850. It was at this time that the Greenwich trains began their right-hand running, probably as a convenient method of working the three lines (two up and a common down) to North Kent East junction, where the Greenwich and Gravesend lines diverged. Coincident with the building of the line from Sydenham to Crystal Palace in 1853-54, the Brighton station was almost doubled in size.

The sixties formed one of the most important periods in the history of the station, for not only was the Brighton section once more enlarged, to cater for the South London line (opened in 1866) but the purely terminal character of the station ended and a partial through station was introduced on the South Eastern section with the construction of the lines to Charing Cross and Cannon Street (opened in 1864 and 1866 respectively). Further, in this decade the L.B.S.C.R. built the Terminus hotel alongside the station; it was leased to an hotel company, but in 1893 was taken over by the Brighton Railway for office accommodation. The Cannon Street extension involved raising the connecting line through the South Eastern platforms at a grade of 1 in 100, so that the Thames could be crossed at a reasonable height, and this despite the fact that the whole station was built on arches to the height of the London & Greenwich Railway. No major alteration has been made to the ensemble of the station since the sixties, but a final widening took place in 1901, on the north side this time, and raised the number of tracks outside the station to a total of eleven.

The track layout, platform lengths, and signalling system have been modified from time to time, both before and after electrification, which began in 1909 with the conversion of the South London line. Further tracks in the Brighton section were converted when the Crystal Palace lines were electrified in 1912. The working of the South Eastern Railway side was revolutionised when the eastern lines were electrified in 1926-28, and the 21 platforms of the whole station now deal with 2,400 trains a day, of which over 90 per cent. are electric. The northern side of the station (platforms 1-4, 6 and 7) is known as the Eastern Section; platforms 8 to 11 (on the site of the original Greenwich terminus) as the low-level, because of the raised Eastern Section tracks adjoining; and platforms 12 to 22 (on the southern side) as the Brighton or Central Section. The feature of the station working is the enormous passenger transfer traffic from the Central and low-level stations to the Eastern Section, and from one platform to another of that section, so that while nearly 150,000 persons pass through the barriers daily, the actual number of travellers using the station must approach a quarter of a million.

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Madras & Southern Mahratta Railway

IN addition to the lines owned by the Government of India, the Madras & Southern Mahratta Railway Company works 271½ miles of Mysore State lines, 51 miles (metre gauge) of the West of India Portuguese Railway, and a further 126½ miles belonging to States and District Boards. At March 31, 1935, the company's own system consisted of 1,119 miles on the 5 ft. 6 in. gauge, of which nearly 4 miles were quadruple track and 48¼ miles double track, and of 1,660½ miles on the metre gauge, of which 1¾ miles were double track. The total length open was 3,228½ miles, or 1½ miles less than at the end of the previous year, owing to the dismantling of the Nagalapuram—Ramanamalai metre gauge branch. Capital expenditure during 1935-36 amounted to Rs. 21·33 lakhs (£160,009) as compared with £99,886 in 1934-35. On track, structures, and equipment the expenditure was Rs. 10·06 lakhs, including the remodelling of Hubli station, and track and sleeper renewals and stone ballasting. Expenditure on rolling stock amounted to a total of Rs. 4·83 lakhs.

From the report for the year 1935-36 it appears that gross earnings of the entire system, exclusive of refunds, were Rs. 16·07 lakhs lower than for 1934-35, expenses increased by Rs. 8·36 lakhs and net earnings were lower by Rs. 24·43 lakhs. Coaching traffic has continued to fall principally because of increasing road competition. All that can be done by the administration to counteract it is being done. Diesel railcar services have been introduced on appropriate sections, light train services organised where they are called for, fares adjusted and timetables re-arranged, with the effect of checking diversion of traffic and in some cases bringing traffic back to the railway. For the fall of Rs. 12·01 lakhs in goods traffic receipts the decline in ground nut consignments was responsible, as the traffic in most commodities was generally satisfactory. General administration expenses showed an increase of Rs. 3·19 lakhs, due almost entirely to abolition of cuts in pay. On repairs and maintenance the

expenditure was Rs. 4·66 lakhs less, but operating expenses were heavier by Rs. 9·46 lakhs. Abolition of the cuts in pay, higher fuel costs, the creation of the commercial department, and extra staff required on the coming into force of the Hours of Employment Regulations all contributed to this increase. Expenditure on replacements and renewals showed a small increase consequent on a larger programme of re-railing. Some comparative figures are given in the accompanying table:—

	1935-36	1934-35
Mean mileage worked	3,237	3,237
Train-miles	13,191,163	13,041,286
Passengers	30,533,172	30,429,530
Goods, tons	5,525,240	5,573,536
Operating ratio, per cent.	61·8	59·3
	Rs. lakhs	Rs. lakhs
Coaching receipts	259·59	265·66
Goods receipts	447·94	459·95
Gross earnings	731·03	747·10
Working expenses	451·47	443·11
Net earnings	279·56	303·99

The company's share of surplus profits from State and Company's railways for the year 1935-36, less Indian income tax and supertax, amounted to Rs. 15,22,285, against Rs. 20,57,629 for 1934-35. Adding Rs. 50,997 surplus profits from the Mysore State Railway, as compared with Rs. 53,040 for the previous year, gives a total which realised £119,004, comparing with £159,479 for 1934-35. The total distribution to stockholders (including the 3½ per cent. guaranteed interest) will be 8 per cent., as against 9 per cent. for 1934-35. A sum of £55,000 is to be withdrawn from the dividend equalisation fund. In view of the possible determination of the company's contract at the end of 1937, a further sum of £7,500 is being placed to the London Office Contingency Fund. Gross earnings for the current year show little sign of material improvement and working expenses are expected to be higher.

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Railways and Agricultural Shows

THE British railways have for many years been closely associated with the organisation of the agricultural shows which play such an important part in the life of the farming community of Great Britain. These shows involve a heavy concentration within a very short period of many varieties of livestock and a multiplicity of exhibits, ranging from agricultural machines and implements to feeding stuffs and seeds. To facilitate the arrival and despatch of this traffic in the minimum of time, comprehensive working programmes are evolved in close co-operation with the show authorities and the numerous exhibitors. Special well wagons of various types, fitted with vacuum brakes, are used for the conveyance of the heavy machinery, while flat and glass wagons are used in large numbers, and special livestock vehicles afford accommodation for the conveyance of the herdsmen as well as the animals. Considerably augmented cartage facilities are provided for the work of transferring the exhibits from the railway sidings to the show grounds, and a noteworthy feature of recent years has been the increasing use which is made of tractors, trailers and mechanical horses. The capacity of these tractors ranges from six to fifteen tons, and, to overcome the difficulties which are frequently experienced in delivering heavy machinery over wet and soft ground, specially adapted tractors are used and thousands of railway sleepers laid down for making suitable tracks. As a good deal of the show traffic cannot be unloaded by the exhibitors at the time of delivery, trailers which can be left at the stands are being used in considerable numbers, thus freeing the motive units for service elsewhere.

For the cartage of livestock, special trailers and rubber-tyred floats drawn by mechanical horses are provided, the trailers being constructed so that the sides may be detached to enable the vehicle to be used as a low loading trailer for machinery, cables, and so forth. Mobile cranes with a lifting capacity up to six tons are available on the larger show grounds for facilitating the loading and unloading operations at the various stands, thus releasing the trailers for other work, while for the delivery of small miscellaneous exhibits such as seeds and cattle medicines, ordinary motor vans are used. The railways also provide special enquiry offices at shows throughout the season. A good deal of the show traffic is transferred from show to show throughout the country during the summer, and by close co-operation with the show authorities and exhibitors, detailed arrangements are made for the conveyance of complete exhibits with the utmost expedition. Traffic has frequently to be moved from one show at night and delivered to the next show by the following morning. In order to assist exhibitors, the railways also convey livestock, agricultural machines, implements and other traffic, when unsold, back to the home station at owner's risk at half the rate charged on the forward journey. In addition, men in charge of livestock, when travelling by the same train as the animals, are conveyed free of charge subject to certain conditions, and a quantity of provender or feeding stuff is conveyed free to and from shows in the same vehicle as the animals, the balance being conveyed at very favourable rates.

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Evening Excursions in Scotland

ONE night early in June, 1933, a special train, running in numerous portions, conveyed passengers from Glasgow to Ayr and back for the unusually small sum of 1s. 6d. That was the pioneer Scottish evening excursion, and since that night over three years ago, the Scottish sections of the L.M.S.R. and L.N.E.R. have, between them, evolved a complex system of cheap evening services. Every week trains run from cities to coast and from coast to country, from country to coast and from the coast to the Highlands; there seems to be no limit to the variety of trips offered. The distances covered are often astounding—the word is used without a trace of exaggeration—and rock bottom fares are charged. Evening excursions have done as much to popularise railway travel in Scotland as any recognised advertising medium introduced in recent years. The season which closed recently saw the evening excursion at the peak of its development. One of the many novel features of modern evening trips is that the special trains often connect points which never at any time have had through services in the regular timetable. For instance, one run, which has been given occasionally, is from Arbroath, on the Dundee & Arbroath Joint Line, through Dundee and Perth to Pitlochry, Killiecrankie, and Blair Atholl on the Highland line. The trip has also been performed in the reverse direction. A further unusual cross-country route is from Dumfries to Ayr. Typical examples of long return trips are Aberdeen to Elgin (174 miles) for 2s. 6d.; Aberdeen to Perth (181 miles) for 2s. 9d.; Dundee to Aberdeen (143 miles) for 2s. 6d.; Glasgow to St. Fillans via Lochearnhead (142 miles) for 2s.; and Glasgow to Dumfries (164 miles) for 2s. 6d. That list by no means exhausts the programme; there are many shorter trips offered at fares ranging from 6d. to 1s. 9d. The trains usually leave their starting points between 4 and 5 p.m. and return between 11 and midnight (all the distances given above are for the return journey).

A striking development in the evening excursion system has been the inclusion of "compressed" versions of

famous day tours in the programme. These tours sometimes involve non-railway services. For instance, the Trossachs tour from Edinburgh or Glasgow to Callander, and from there to Loch Katrine and back by coach, costs 7s. if performed during the day. Exactly the same tour costs 3s. 3d. in the evening. An even more elaborate example is the Loch Tay tour—rail to Killin with a cruise on Loch Tay; the day tour costs 10s., the evening tour 3s. 9d. The "rail cruise" is a specialised form of evening excursion. A very popular cruise is run from Glasgow to Crainlarich by the L.N.E.R., returning via Callander (L.M.S.R.). This trip, which is performed by the green tourist trains, costs 3s. L.N.E.R. locomotives handle the train throughout, although L.M.S. enginemen ride on the footplate while the train is on "foreign" territory. This unique tour is not to be found anywhere except on evening excursion programmes. Another popular tour is from Glasgow to Girvan via Turnberry, returning via Maybole. This train is also "exclusive" to evening trippers. Indeed, the Turnberry route to Girvan has been closed to regular passenger traffic for the past six years. St. Fillans, the prettiest village in Perthshire, is near the geographic centre of Scotland, and this fact has helped to make it the most popular of all evening cruise destinations. Trains go to it from Glasgow, Edinburgh, Dundee, Perth, and other towns. They run outwards via Crieff and Comrie, and return via Lochearnhead and Loch Lubnaig, thus completing a wide circuit of the most beautiful part of Perthshire. The trip is often run in the reverse direction.

Not only the principal town stations, but suburban and wayside stations receive the attention of the outgoing excursion trains. Often they comb the suburban stations and proceed direct to their distant destinations without touching the main station at all. Occasionally, the suburbs get treats which are denied the city-dwellers. For example, the people of Rutherglen, only three miles from Glasgow, have had the pleasure of going all the way to Carlisle for 2s. 9d., but Glasgow has never been given this extraordinary facility. Folders outlining the evening trips for the following week are obtainable at the various stations every Saturday. Notices also appear in the Saturday newspapers, and further prominence is given to railway enterprise by sandwichmen who parade the streets in towns and suburbs. The advertising value of these trips has been mentioned already. Many patrons of the excursions are people who rarely or never travel long distances by rail, or who have not been in a train for years. The L.M.S.R. trains are often made up of the newest low-waisted compartment or open-vestibule stock, and it is a common experience to hear surprised passengers praise the appearance and comfort of these vehicles in no uncertain terms. These passengers will travel by rail again!

* * * *

Material for Boiler Tubes

ONE of the most debatable points associated with locomotive boiler construction is that of the material of which the tubes shall be made. This point has been virtually settled in modern boiler construction by the more general adoption of steel for the purpose. In the opinion of many locomotive engineers, and probably the majority, copper is superior from the heat conductivity point of view, although its use has been largely abandoned on the score of its greater first cost. As against this, however, its value as "scrap" is much higher than either iron or steel. In Western Australia, as reported in a recent issue of the *Journal of the Institution of Locomotive Engineers*, copper tubes were found successful in themselves, but tended to promote rapid deterioration of the smokebox tubeplates, and as was stated in the paper which Mr. G. W. Blackwood read at a meeting of the Institution of Locomotive Engineers at Perth, Western Australia, solid drawn arsenical copper tubes were tried, an experimental set being placed in a boiler in 1922. These were manufactured from solid billets, hollows being produced by piercing. Three years later they were reconditioned and pierced with 4-in. ends and replaced.

These tubes were reported as being in good condition in 1934, and thus it would appear that the arsenical copper tube is capable of a high mileage due to its hardness and resistance to cinder wear. Considerable experience was also gained with copper-nickel tubes of 97 per cent. copper and 3 per cent. nickel, but with these there was a definite tendency to brittleness, the tubes breaking off a few feet from the tubeplate. They responded rapidly to annealing, but cinder wear in this condition became more pronounced and the tubes pitted under bad water conditions. Another alloy was used containing 97 per cent. copper, 1 per cent. nickel and 2 per cent. zinc. These stood well for about 8 to 10 years and then began to break away at the ends. As the author states, it appears very essential that the alloy should be entirely free from zinc, as the presence of this ingredient upsets the advantages gained by the addition of nickel.

* * * *

Nomograms for Superheated Steam

THE design of an entirely new type of locomotive to meet advancing requirements demands careful calculations based on the specific volume and total heat of superheated steam at various stages. Especially was this the case for a triple-expansion compound locomotive recently designed by the French Office Central d'Etudes de Matériel de Chemins de fer, and in the course of this work M. Ph. Tongas, divisional inspector attached to the office, evolved a number of alignment charts or nomograms by means of which these properties of superheated steam can be read off directly by a simple process of alignment. These diagrams have now been reproduced, with an accompanying explanatory article, by the *Revue Générale des Chemins de fer* (May, 1936). In the ordinary way the properties of the steam must either be obtained from steam tables, or read off from Mollier's diagram. The former method is to be commended for accuracy but involves a double interpolation as a rule between two pairs of adjacent figures, whilst even the longest editions of Mollier's diagram do not dispense with the necessity of interpolation.

M. Tongas's graphs are based on the empirical formulæ of Mollier for specific volume and total heat, with a slight modification to the constants to bring the results more in line with those adopted at the International Steam-Tables Conference in New York in 1934. The diagram for specific volume is divided into three parts, covering different ranges of temperature and pressure, whilst that for total heat is complete in one part. Each consists of three curves suitably scaled, and all that is necessary is to place a straight edge at the appropriate points on the curves of pressure and temperature, when the required value of specific volume or total heat is given by the point of intersection with the third curve. These alignment charts should obviously be of the greatest value to all steam engineers, and M. Tongas mentions that they have been found of great use in calculating heat balances at the locomotive testing station at Vitry. A table is given showing the accuracy of the charts as compared with that of the international steam tables, and it will be seen that this is quite close enough for general purposes.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

A Question of Spelling

304, Beulah Hill, S.E.19.
December 3

To the Editor of The Railway Gazette

Sir,—Mr. C. Hamilton Ellis (in his letter published in your issue of November 27) wants to restore the diæresis and write, "coöperate," I suppose, as well as "coördinate." This, of course, would be to revert to ancient usage, and if he will look up your pages (to look no further) of 30-35 years ago, he will find these and similar words rendered thus as a general rule. The hyphenated construction is quite recent, and to my mind, an improvement, inasmuch as it obviates the Continental flavour, and requires far less mental effort.

Yours faithfully,

O. J. MORRIS

New L.N.E.R. High-Speed Trains

"Westcott," Sedlescombe Road North,
St. Leonards-on-Sea, December 5

To the Editor of The Railway Gazette

Sir,—I read your articles and Mr. Charlewood's letter, respectively in the issues of November 13 and 20, with much pleasure. The timing of the intended 6-hr. London-Edinburgh service is a subject of great interest to me as for many years I have made a special study of L.N.E. and Great Northern traffic. The claims of the business man, an all-the-year-round patron, undoubtedly deserve due consideration but Edinburgh is essentially a tourist, residential, and academic centre also. In this case the claims of the ordinary travellers of both sexes, and of the elderly or less robust folk for whom the railways can cater so admirably, should not be overlooked. These good people are potential supporters who almost invariably prefer midday travel with a comfortable margin for any subsidiary journeys to or from the main-line train. My impression is that the early starts and late arrivals so usual on the Continent in connection with long-distance travels are by no means popular here nowadays among the majority. Indeed, I gathered in the course of conversation recently with a number of passengers in the third diner of the Silver Jubilee train that one of the main contributory features to the immediate and almost overwhelming popularity of that service was the fact that starting from home between 7 and 8 a.m. and "running for the last bus just before 11 p.m." had been superseded by more "comfortable" hours of travel.

Assuming the continuance of existing facilities, my suggestion is that the northbound Coronation express should leave King's Cross at 2.45 p.m., call at Newcastle 6.43-6.48 and arrive Waverley in the time of the present 1.20, at 8.45. Such a path would apparently cause little interference with existing trains of importance. The 1.20 now conveys, usually, an enormous load for Darlington and Newcastle. It could thus be lightened and, with a slight speeding up between Grantham and York and beyond Darlington, make a Durham call and reach Newcastle at 6.30 p.m. It would be passed by, also connect to and from, the Coronation at Newcastle; afterwards going on as the present follow-up train running ten minutes later to Edinburgh. A light, smartly timed connection with the Coronation from Edinburgh to the principal places in Fife and Angus, at any rate as far as Dundee, would also provide a new and probably welcome local feature. Existing Scottish connections with the present 1.20 ex-King's Cross would, of course, be available to passengers leaving London by the 2.45 Flyer, while destinations in the vicinity of Edinburgh could be reached by road at a reasonable hour.

The starting time for the southbound high-speed service from Edinburgh appears to be rather more difficult to decide for the best. It seems a thousand pities that the 9 a.m. fastest Aberdeen-Edinburgh train, arriving 12·4 p.m., should, except on summer Saturdays, have no connection to the North Eastern area and London. Fifty minutes or so later running of the Queen of Scots would fill the breach but it would doubtless be too early in the day to run the Coronation from Edinburgh at 12.15. A departure just after 2.0 p.m., in advance of the present 2.5 from Waverley, would probably be generally popular, giving an attractive fast service from Newcastle to London just after 4.0 p.m. The existing volume of passengers reaching Edinburgh in through carriages for the south about two o'clock and the necessary disturbance of certain standard schedules might cause some complications, but undoubtely these could be easily overcome and passengers would be in London 1½ hours earlier than now.

We now come to the proposed 4-4.30 p.m. departure hour from Edinburgh, which, in view of the more generous facilities (running to a later hour) generally available to outlying parts round London than in provincial centres, could provide an absolutely novel facility connecting with the 12.45 p.m. from Aberdeen and reaching London by 10.30 p.m.: but whether *at that hour* it would be patronised to the extent which it would deserve is a moot point.

Yours very truly,

R. A. H. WEIGHT

Signalling at Waterloo

London, S.E., December 8

To the Editor of The Railway Gazette

Sir,—I have noticed a mistake in the editorial article on page 779 of your issue of November 13. It is there stated that a new 109 lever frame was provided at Waterloo in 1874, that 35 levers were added in a parallel row in 1878, 20 more in 1880, and 65 in 1885, the total being given as 209. These figures, which have been clearly taken from the late Mr. A. W. Szlumper's paper before the Institution of Civil Engineers in October, 1892, have been quoted several times, apparently without anyone noticing that their total is wrong and should be 229. Examination of the original MS shows that the mistake exists in Mr. Szlumper's handwriting, and it is very difficult to say at this time of day which among the figures is incorrect. As the total of 209 appeared in a publication at the time the last "A" box was opened in 1892, independently of Mr. Szlumper's paper, it seems likely that this is correct and that he probably wrote 65 instead of 45, as the number of levers added in 1885, perhaps in copying from some rough pencil notes which were not very distinct. It would be interesting to know if any of your readers can clear up this difficulty.

SIGNALMAN

L.N.E.R. Secretary's Departmental Dinner.—The thirteenth dinner of the Secretary's Department of the L.N.E.R. was held on Tuesday, December 8, at the Great Eastern Hotel, Liverpool Street, where Mr. James McLaren, the Secretary, presided over a gathering of over 80 members of the staff representative of all sections of the Department. Included in the company as guests were Mr. G. Sutherland, the Chief Accountant, Mr. W. R. Mole, Assistant Solicitor, Mr. H. W. J. Powell, the Estate and Rating Surveyor, Mr. J. E. Ryan, the Hotels Superintendent, and Mr. G. F. Thurston, late Divisional General Manager, Southern Area. Mr. H. D. Coleman, in submitting the toast of "The L.N.E.R.," referred to the great revival in trade which had reacted to the advantage of the company, and contrasted the situation today with that of six years ago when he last proposed the toast. Mr. W. R. Mole responded. The toast of "The Chairman" proposed by Mr. L. Stone, was received with musical honours. Mr. McLaren, in reply, expressed his appreciation of the loyal service consistently rendered by all members of his staff.

PUBLICATIONS RECEIVED

The Railway Mania and its Aftermath : 1845-1852. By Henry Grote Lewin, B.A. (Cantab). London, 1936 : THE RAILWAY GAZETTE, 33, Tothill Street, Westminster, S.W.1. 8¾ in. × 5½ in. × 1¾ in., 500 pp. + 13 coloured maps (including 5 folding maps). Price 12s. net.—The name of Mr. Henry Grote Lewin is doubtless familiar to all students of railway history by reason of his book which appeared originally in 1914 under the title of "The British Railway System," and was re-published in 1925 in very considerably amended and improved form as "Early British Railways." That volume dealt with the period 1801 to 1844, and therefore, as the book now under review takes the story onward from 1845 to 1852, it is in some senses a sequel to "Early British Railways," and is so described on the title page.

The present volume has, however, far greater claims on the attention of all railway students than this description would imply, for the treatment of "The Railway Mania and its Aftermath" has resulted in a very much more readable and useful volume than its predecessor. It must be recalled that there are many fundamental differences between the varieties of railway development covered by the years 1801 to 1844 and 1845 to 1852 respectively. In the former are to be found the beginnings of the physical properties of railways and steam locomotives ; in the latter the development of a financial and competitive system of railway promotion which has influenced transport in Great Britain right up to the present day. The earlier period possesses by no means plentiful contemporary literature, but the years 1845 to 1852 were characterised by the issue of a tremendous output of periodical and other publications dealing in the main with railway finance and promotion, and Mr. Grote Lewin would have deserved well of all railway readers if his work were no more than the presentation within reasonable compass of the essentials of the voluminous literature of the railway mania period.

As it is he has done very much more than this, for, in treating the railway mania phase in an historical sense, he has divested this important episode in the life of the nation of its purely gambling aspect and, without losing the railway atmosphere of the period, has drawn out, more particularly from the point of view of the development of traffic, the evolution of the railway schemes that actually came to fruition, and the relationship of Parliament and the Board of Trade towards railways.

For many years past, all concerned with railways, or interested in railway development, have known something of the railway mania proper, namely, the years 1845 to 1847, which comprised an orgy of railway promotion, but little has been published of the aftermath of this period until recently. In our issue of November 9, 1934, we reviewed "The Railway King : 1800-1871," by Mr. Richard S. Lambert, describing that work as "the most notable contribution in the present century to non-engineering railway biography," and we have no hesitation in according to the present volume the comparable remark that it is the most notable contribution within recent years to early British railway history. Both works are concerned largely with the same period, the one from the aspect of the man, George Hudson, who was the outstanding character in railway circles of the time ; the other is a more general narrative of the period, largely ignoring personalities and omitting the financial position and dealings of the various railway companies except insofar as such are necessary in explanation of the traffic history.

A useful feature of the present volume is that the book has been so arranged that readers wishing to acquire only a general knowledge of the period can do so without having to cope with comprehensive detail. This has been made possible by the segregation into separate chapters of the details dealing with specific proposals for new railways and with the various openings of lines ; these chapters can be omitted without losing the gist of the story. It has not been overlooked that some will use this volume as a permanent work of reference, and provision has been made for such readers. A special system of marginal references has been adopted to enable the history of a particular railway company to be followed with ease, and these references include many to chapters in "Early British Railways," prefaced by the initials "E. B. R."

As the aftermath of the railway mania is not a clearly-defined period, such as the mania itself, the author has found it necessary to fix some arbitrary point at which to bring his volume to a close. The year 1850 provided the low-water mark of the reaction from the mania, after which, by slow degrees, confidence returned, and railway promotion resumed a more normal course. Two years later the opening, in July, of the final portion of the Great Northern Railway main line, and in October of the broad-gauge G.W.R. line to Birmingham, marked the completion of the principal lines sanctioned during the mania period, and we think it would be difficult for Mr. Grote Lewin to have selected a more satisfactory date than 1852 with which to conclude his story.

Special mention must be made of the maps and tables contained in this volume. There are in all 13 coloured maps, of which the five covering England and Wales are large folding plates. These show for the years 1845, 1846, 1847, 1848, and 1852 the railways open and also those sanctioned but not yet built. Comparable smaller maps give similar information regarding Scotland north of the Forth and Ireland. Among the 15 tables are some interesting comparisons of train times ; traffic receipts ; rates of dividend for the period of years covered by the book ; and specimen costs per mile of railway construction. Also tabulated are lists of new railways sanctioned during the six years, and all mileage opened, showing the date of opening, company, section of line, and mileage of each section.

A foreword to the volume is contributed by Sir Ralph Wedgwood, Chief General Manager, L.N.E.R., who points out the special interest for us today attaching to the development of our railway system throughout the chaotic and boisterous stages of its youth, in view of the light thrown on various controversies, and the lessons both pleasant and unpleasant which may be learned. Sir Ralph also emphasises that, whereas we have histories of the locomotives in abundance, and there is no lack of similar volumes covering railway construction and the physical problems overcome by early engineers, the works which deal with the Parliamentary and traffic sides of railway development are few indeed, and from this point of view he says that Mr. Grote Lewin's book is especially welcome.

Winter Sunshine.—The 1936-7 edition of this holiday booklet, from Thomas Cook & Son Ltd., Berkeley Street, London, W.1, is bound in a cheerful yellow cover that reflects its sunny contents. Whether the Continent, North Africa, or the British Isles attract the traveller, he will find the way to trouble-free journeys and congenial accommodation for the winter months in these two hundred illustrated pages.

Woodworking Tools.—Thomas Robinson & Son Ltd., of Rochdale, has issued an illustrated folder of cutters, grinders, and subsidiary equipment for woodworking machines. It is pointed out that properly sharpened tools last longer, and give better and greater output with less effort ; a range of motor-driven setting-up and grinding machines provides the means for the execution of all maintenance work with accuracy and speed. There is a list of useful points to be observed in cutter grinding.

Power Transmission by Belt.—Numerous illustrations in a booklet published by James Hendry Limited, 252, Main Street, Bridgeton, Glasgow, show the steady running and resistance to wear in heavy service of the firm's laminated belting. The belting illustrated is working tube mills, fans, and pumps in gold mines, and there are many interesting notes regarding the conditions under which the equipment operates. As an example of the long life of the belts, it may be mentioned that frequently after twelve to thirteen years on main mill drives they are divided into 18 in. widths and run for several years on tube mills before being finally discarded. One instance is mentioned of a belt being replaced only after 23 years of continuous service.

THE SCRAP HEAP

A CRYSTAL PALACE MEMORY

When the Crystal Palace was first erected in Hyde Park for the Great Exhibition of 1851, it was approached by a long covered way. Subsequently, this covered way was acquired by the West India Dock Company and re-erected on the Rum Quay at West India Dock. Ever since then coopers have worked under its protection preparing puncheons of rum for gauging by H.M. Customs, &c. A section was destroyed during the great rum quay fire of 1933, but most of the original structure is still in use. In the vaults beneath is stored rum to the value of £7,000,000, inclusive of customs' duty.

* * *

From one of our readers comes the complaint that a herd of cattle became intoxicated through eating cider apples. Rolling stock, eh?

* * *

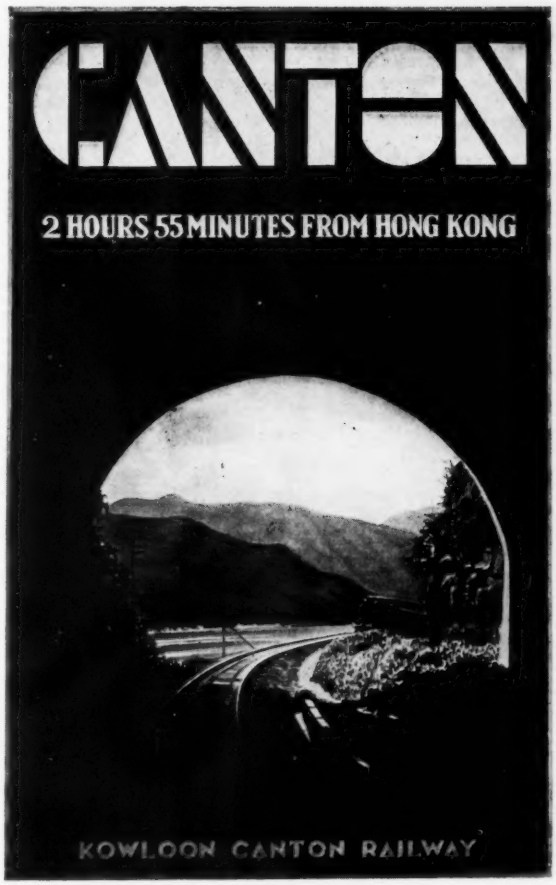
A statement to the effect that the American railways are paying for the best in personnel and that "forward looking managements would see to it that, in hiring new men, they get what they are paying for"—brought forth the rejoinder that the railways must at the same time "keep in mind the difference between *hire* and *hire purchase*."

* * *

Recently about 50,000 goldfish were received at Southampton Docks in the *Aquitania*, and further consignments averaging 200,000 a ship are expected regularly each week in the liners *Queen Mary*, *Berengaria*, and *Aquitania*. These heavy shipments have necessitated the construction of a specially equipped aquarium on the Southern Railway premises in the docks, for the storage of these fish, which will be distributed by rail to stores in all parts of the British Isles.

YORK'S "BLACK MUSEUM"

I found an instructive corner for amateur sleuth-hounds the other day in the Railway Museum at York, part of which is devoted to articles associated with dark deeds on the railways. The most morbid exhibits are a razor taken from a suicide and photographs of the interior of "Dickman's carriage." Some readers may remember the Newcastle train murder in 1910 when a colliery-cashier named Nesbitt was murdered by a man named Dickman, who was afterwards hanged. Another exhibit is a quantity of spurious money—some early issues of pound and ten-shilling notes which, despite their crudeness, had managed to pass the booking clerk; a bag of silver money (slashed now so that visitors shall not attempt to pass them themselves); and several "flash" notes, forgeries of high-denomination bank notes used to impress and delude victims, taken from card sharpers. In the collection there are also skeleton keys, a safe-breaker's outfit, knuckledusters, and pistols. The suffragettes are represented by a rosette and a letter from Elizabeth Fry to the Right Hon. H. H. Asquith headed "The Women's Social and Political Union."—*From a recent note in the "Yorkshire Post."*



Reproduction of striking coloured poster advertising travel facilities on the Kowloon-Canton Railway

One Hundred Years Ago

Extracts from the December, 1836, issue of "The Railway Magazine" (afterwards "Herapath's Railway Journal") and the oldest constituent of THE RAILWAY GAZETTE

Great Western Railway: Commencement and Progress of the Works.—The Act received the Royal Assent on the last day of August, 1835. The letting of the contracts for works commenced on November 26 following, and since that period contracts have been entered into on satisfactory terms, as compared with the engineer's estimates, for nearly 40 miles of the line, to the amount of upwards of £650,000. The works are now in active progress between London and Reading, Bath and Bristol, and at the Box tunnel, and the line is marked out, and the preliminary steps for preparing the contracts of the principal works in the intermediate portion are completed. It is expected that the line will be completed from London to Maidenhead in the Autumn of 1837, from Bristol to Bath in the Spring of 1838, from Maidenhead to Reading and to Oxford by the Autumn of 1838, to the Cheltenham branch in the Spring of 1839, and the whole completed within four years of the commencement. The satisfactory execution and completion of all the contracts in their different stages, within the respective times allotted to each, is secured by periodical penalties.

London & Birmingham Railway.—The Directors, it is said, have thought it requisite to increase the weight of the rails, which are wrought iron, from 50 lb. per yard, as originally intended, to 75 lb.

Railroad from Oxford to Cambridge, &c.—A meeting of the principal inhabitants of Luton, Bedfordshire, was held at the George Hotel in that town, and resolutions passed to support the proposed line of railway from the termination of the Cheltenham, Oxford, and Tring line to Cambridge and the eastern coast, Edmund Waller, Esq., in the Chair. Forming a junction with the great Eastern and Western lines, it will cross the London and Birmingham line near Tring, in Hertfordshire.

Snow on Railways.—Much curiosity was manifested on October 29, in consequence of the heavy fall of snow, which, it was feared, would greatly impede, if not prevent the running of the trains on the Greenwich Railway; but not the least inconvenience was experienced, and carriages ran as usual.

XUM

OVERSEAS RAILWAY AFFAIRS

(From our special correspondents)

CANADA

C.P.R. Light-weight Trains

The four light-weight air-conditioned trains with "Jubilee" class 4-4-4 type locomotives recently completed for the C.P.R. have now been assigned to the following services: Montreal—Quebec (2), Toronto—Detroit (1) but with two locomotives, and Calgary—Edmonton (1). The schedules are as follow:—

Service	*Name of Train*	*Distance*	*Schedule*	*Intermediate Stops*
		miles	hr. min.	
Montreal-Quebec	—	173	4.30	32
Toronto-Detroit	The Royal York	229	5.35	19
Calgary-Edmonton	Chinook	194	5.15	22

[These engines and trains were described in our issues of August 7 and October 30 last.—ED. *R.G.*]

ARGENTINA

Railway Pensions for Disability: Supreme Court Ruling

One of the amendments to the National Railway Pension Law, passed by the Senate last year (THE RAILWAY GAZETTE of April 19, 1935), ruled that pensions paid to the unmarried daughters of deceased employees should cease at the age of 22, except when the beneficiaries were physically incapacitated from earning a livelihood. The daughter of a deceased employee, whose pension was withdrawn on attaining the specified age, requested that it be continued, on the ground that she was in bad health. This request was acceded to temporarily, but after a subsequent medical examination had shown that she had recovered, the pension was discontinued. The beneficiary thereupon appealed to the Federal Court, which upheld her claim and ordered the board to continue payment of the pension. The case was then taken to the Supreme Court, which declared that although the clause which prohibited the unmarried daughters of deceased employees from drawing a pension after the age of 22, "except in cases of ill-health," did not explicitly state that such disability must be permanent, this condition was nevertheless implied. The Court also cited the regulation which required all railway employees or their dependents in receipt of invalid pensions or allowances, to undergo a periodical medical examination, in order to determine whether the state of their health justified their continuing to be a charge upon the fund. In the present case the beneficiary had been found to have recovered her health, and she had therefore no further claim to a pension. The lax way in which invalid pensions were at one time granted, as well as the undue liberality of the law before it was amended, was a serious drain on the fund, and it is satisfactory to know that the authorities are now carefully scrutinising all applications under this head.

Faster Speeds

The Argentine public is demanding faster travelling, more especially in connection with holiday traffic. Some two years ago, the Central Argentine Railway reduced the timing for its daily Buenos Aires—Rosario express, known as the Rápido, from 4¼ to 4 hr. for the 188 miles. This development has been much appreciated by the commercial community in both cities, as the timings enable business men to make the double journey rapidly and comfortably in a day, with ample time for the transaction of business.

In anticipation of a heavy passenger movement to Mar del Plata during the coming season, the B.A.G.S.R. is preparing to speed up its daily express service from Buenos Aires to that famous South Atlantic resort. With this end in view, a recent trial run was made with a train similar to a day express, which covered the distance of 250 miles in each direction in 5 hr. 30 min., as compared with the previous fastest timing over the same route of 6 hr.; the normal time of the proposed new schedule will, however, be 5 hr. 40 min. and on certain other trains 5 hr. 50 min. South of Altamirano station, 54 miles from Buenos Aires, the line is single, a circumstance which militates against higher speeds.

The exceptionally long stretches, characteristic of Argentine railways, of perfectly straight and level track, with no tunnels and very few sharp curves or gradients, make them pre-eminently adapted to the development of high speeds, with the powerful locomotives generally in use, and, as soon as the financial position justifies more stone-ballasting and doubling, on the main lines, new speed records will no doubt be registered.

SWITZERLAND

Branch Line to be Closed

Authority has been granted by the Federal Council to close the single-line branch from Otelfingen to Niederglatt, near Zurich, in the course of next year (probably in May). This line, which was opened in 1877 and is 12·6 km. in length, is the first to be entirely closed to traffic since the formation of the Federal Railways, with the exception of the short section from Weesen to Näfels which was closed in 1917 and definitely abandoned in 1933. The Otelfingen—Niederglatt line was referred to in the October 23 issue of THE RAILWAY GAZETTE in connection with a report on the possibility of closing certain branch lines in Switzerland.

Slight Improvements in October

Several private companies, including the Rhaetian, Brig-Visp-Zermatt, Bernese Oberland, Wengernalp, and Jungfrau Railways, report a slight increase in their October receipts as compared with October, 1935. The Federal Railways receipts for the same month show a decrease, but less accentuated than in the first nine months of the year, when the average falling-off was 9·7 per cent.; for October the proportion was only 6·5 per cent.

PORTUGUESE EAST AFRICA

New Lines

Surveys have been completed for two new branches from the metre-gauge Gaza railway, which runs north from Chai-Chai, at the mouth of the Limpopo. One of the branches will run from the present railhead at Chicomo, 56 miles from Chai-Chai, and the other from Mahusse, about half-way between the terminii. Both new lines are intended to serve big sawmills.

MANCHUKUO

Railway Construction

As mentioned on various occasions in THE RAILWAY GAZETTE, railway construction in Manchukuo is steadily continuing, an average mileage of about 350 being opened to traffic yearly. The (lower) illustrations (on page 983) show some of the construction methods. The planning, construction and operation of the State Railways have been entrusted to the South Manchuria Railways Company, which has established the State Railway Bureau in Mukden as head office for the operating services. The construction of the new lines is organised by close co-operation between this office and the S.M.R. head office in Dairen.

The works are carried out by local contractors, in comparatively small contracts; usually separate contractors for earthworks, bridges and culverts, tracklaying, buildings, &c., or occasionally complete sections of a few kilometres including all works. The severe and long Manchurian winters make the working season short, and the usual procedure is to lay a surface service line for the transport of construction materials to the building sites from the outset, as roads are practically non-existent. Embankments are made from borrow pits on one or both sides of the line, spoil from cuttings is deposited at the side, and all earthworks are carried out by hand labour. Owing to the very low cost of land and the cheapness of labour, it is hardly ever economical to make use of the spoil from

cuttings for building the adjoining embankments.

Most of the country is flat and barren, the west and north are hilly and here there are forests. In the plains construction is rapid, the only difficulties met with are floods, and as the rainy season falls in summer, these shorten the already limited working season still further. The new lines are opened to provisional traffic at the earliest opportunity, before stations are built and before any ballasting is begun.

Usually 65-lb. to 85-lb. standard flat-bottomed rails are used on timber sleepers, without chairs or sole plates, secured with dog and not screw spikes. The rails are laid vertical, but the wheels of the rolling stock have conical tyres. Stone ballast of good quality from local quarries is used. All permanent way materials are supplied locally or imported from Japan; the North Manchurian forests supply the sleepers.

The lines are all single track, worked on the staff and tablet system; points and signals are hand operated. The locomotives, coaches and wagons are of standard types, built in the S.M.R. workshops or imported from Japan.

Rashin Port

One of the most important railway construction works in Manchuria has been Rashin Port, opened on November 1, 1935. The port is connected with the State Railway system by a 10-mile branch line from Yuki on the Hsinking—Kirin—North Korea main line. The combined rail-sea distance between Hsinking and Tokyo via the Rashin route is 1,290 miles as against 1,880 miles via Dairen and 1,810 miles via Korea. The port works were begun in 1933; on the spot where only a small fishing village existed has grown a town of 30,000 inhabitants. The first stage of the project included a breakwater, and three piers each 1,000 ft. in length, and equipment for a traffic amounting to 3,000,000 tons per annum is now under way; at the opening of the port, a year ago, accommodation for three 5,000 tons vessels was available. When completed the harbour will accommodate 16 vessels of from 4,000 to 8,000 tons alongside the quays at a time. The final works are expected to be completed in 1947.

In connection with the port a city planning scheme for a population of 300,000 has been approved by the Government, estimated to cost Y. 2,700,000 (£160,000). An area of 10,000 acres is available and is surrounded on three sides by mountains, and on the fourth by Rashin Bay, which is entered from the sea through three channels formed by two islands at the entrance. The railway line enters Rashin through a tunnel 2¼ miles long. One of the illustrations on page 983 shows the site of the port from the air. It is actually situated in Korean territory, but both the railway and port are operated by the Manchukuo Railways.

CHINA

Peiping-Mukden Railway

Charges for the transportation of money over a certain sum were raised by the Peiping-Mukden Railway on November 1. Under instructions from the Minister of Railways passengers carrying sums exceeding $2,000 in notes, $200 in nickel coins and $20 in copper coins will have to declare the amount and transit charges will be collected according to scale.

Kiaochow-Tsinan Railway

The freight rolling stock of the Kiaochow-Tsinan railway is inadequate for the increasing demands of traffic on the line and efforts are being made to obtain the loan of 200 cars from other railways. Last year 100 freight cars were obtained from abroad and present demands of traffic call for further increase.

INDIA

Viceroy Addresses Railway Conference Association

The annual session of the Indian Railway Conference Association opened at New Delhi with a full attendance of delegates from the railways in India and Burma. His Excellency the Viceroy opened the conference which was presided over by Mr. H. N. Colan. The distinguished visitors included Sir Ralph Wedgwood and the members of his committee, Sir Frank Noyce, Sir Guthrie Russell and Mr. P. R. Rau.

In addressing the conference, the Viceroy referred to the debt owed by India to her railway system, which had greatly facilitated industrial and agricultural progress in the country. The important part played by the railways in the mitigation of the severity of famine and in the development of internal and foreign trade more than compensated for the loss sustained in the working of the railways during the first 40 years of railway construction in India. In the 30 years that followed, railways generally, fully justified their existence as commercial undertakings, and the contribution which they made from their surplus to general revenues was so consistent and of such importance that its failure during the last few years was a matter for very serious concern. It was generally known that the principal reason for this failure was one which had affected practically every country in the world and some countries far more materially than India. The process of recovery must inevitably be slow, and the obligation which lay upon everybody concerned to take all practical steps to hasten it was both real and urgent.

His Excellency appreciated the unceasing efforts the railways had all made during the last few years to effect all practical economies consistent with efficient working. The reduction of working expenses by over Rs. 6 crores between 1929-30 and 1931-32, the Viceroy regarded as a remarkable achievement He nevertheless asked the railway administrations not to relax their efforts in the pursuit of economy; such efforts were as essential as ever if the railways were to be restored to the position they held several years ago.

In acceptance of the recommendation made first by Sir Otto Niemeyer and strongly supported by the Public Accounts Committee, the Government of India recently appointed a committee of railway experts, presided over by Sir Ralph Wedgwood, who would examine railway finances and recommend such measures as would expedite their rehabilitation and further the coordination of transport.

Faster and Generally Improved Services Advocated

His Excellency suggested that the depressing features of retrenchment were largely mitigated by the reflection that the prime purpose of economy should be to prepare the way for new enterprise and for better service to the public. The monopoly once enjoyed by railways had disappeared and the railways must now bestir themselves to attract traffic by improving their facilities. As an example of what had been done in recent years by railways in England and other countries to increase the sale of their transport, the Viceroy referred to the Silver Jubilee train running on Sir Ralph Wedgwood's line between King's Cross and Newcastle, which provided travel at a speed which was world-famous and with comfort for passengers that was unsurpassed. It was an outstanding example of what imagination and enterprise, conceived during a period of bad years, could do to attract the passenger.

It was the duty of all railway administrations, the Viceroy continued, to ascertain what the public wanted and to do their utmost to provide it, more especially now that other forms of transport were rising up in competition. Services both for passengers and freight must be speeded up, and passenger amenities must be improved, especially those provided for the humblest class of traveller forming the bulk of India's travelling public. His Excellency was gratified to learn that active steps were in progress to improve the standard design of third class carriages. He also understood that the possibility of introducing air-conditioning for certain trains was being closely examined. In another direction, he gathered, exhaustive experiments were being undertaken to ascertain whether faster and heavier trains could be run over existing track and bridges. If these experiments proved successful they should result in great economies in renewal expenditure. Lord Linlithgow concluded by urging the railway authorities to redouble their efforts and to prove that the principal lesson to be learnt of adversity was inspiration to better things.

XUM

BRITISH RAILWAY STATISTICS

"The Railway Gazette" monthly table for August, 1936, as compared with August, 1935, compiled from the Ministry of Transport Statement No. 201

Description	Great Britain*	G.W.R.	L.N.E.R.	L.M.S.R.	S.R.
PASSENGER TRAIN TRAFFIC—					
Number of pass. journeys (ex. season ticket holders)	124,699,926	11,375,561	22,066,041	32,493,150	21,974,434
Increase (+) or decrease (−)	+ 2,329,557	− 153,657	+ 521,808	+ 157,905	+ 556,185
Passenger receipts (excluding season ticket holders)	£7,439,615	£1,112,777	£1,623,511	£2,500,892	£1,573,129
Increase (+) or decrease (−)	− £134,465	− £44,347	+ £1,774	− £103,747	− £4,706
Season ticket receipts	£890,079	£54,674	£169,510	£244,093	£286,967
Increase (+) or decrease (−)	+ £116,438	+ £6,895	+ £16,591	+ £21,387	+ £47,275
Parcels and misc. traffic receipts (excluding parcels post)	£1,033,611	£189,160	£313,053	£376,036	£136,719
Increase (+) or decrease (−)	− £27,268	− £8,041	− £9,150	− £7,772	− £237
FREIGHT TRAIN TRAFFIC—					
Freight traffic (tons) (excluding free-hauled)	21,337,733	5,020,789	9,731,356	9,981,281	1,285,896
Increase (+) or decrease (−)	+ 1,063,783	+ 117,531	+ 690,959	+ 675,418	+ 26,764
Net ton-miles (excluding free-hauled)	1,255,884,300	232,903,992	417,437,092	517,347,364	54,187,021
Increase (+) or decrease (−)	+ 88,232,648	+ 18,623,897	+ 25,455,227	+ 40,543,379	+ 1,230,527
Average length of haul (miles) (excluding free-hauled)	58·86	46·39	42·90	51·83	42·14
Increase (+) or decrease (−)	+ 1·27	+ 2·69	− 0·46	+ 0·59	+ 0·08
Freight traffic receipts	£6,808,020	£1,170,000	£2,184,000	£2,852,000	£382,470
Increase (+) or decrease (−)	+ £357,617	+ £65,500	+ £109,000	+ £153,000	+ £11,373
Receipts per ton-mile	1·301d.	1·21d.	1·26d.	1·32d.	1·69d.
Increase (+) or decrease (−)	− 0·025d.	− 0·03d.	− 0·01d.	− 0·04d.	+ 0·01d.
Freight train-loads: Average train-load (tons)	126·22	133·90	130·27	124·39	103·95
Increase (+) or decrease (−)	+ 2·38	+ 4·32	+ 1·35	+ 2·46	+ 1·30
Net ton-miles—					
Per train engine-hour	1,000·68	1,068·71	1,036·83	985·72	784·81
Increase (+) or decrease (−)	− 16·49	+ 4·82	− 20·89	− 18·58	− 48·07
Per shunting-hour	887·78	800·12	960·92	941·40	566·14
Per total engine-hour	470·43	457·56	498·72	481·53	328·89
Net ton-miles per route-mile per working day	2,756	2,724	2,909	3,271	1,170
Increase (+) or decrease (−)	+ 190	+ 203	+ 177	+ 242	+ 41
Wagon-miles. Total	368,099,130	65,324,969	127,079,172	155,167,412	18,310,367
Increase (+) or decrease (−)	+ 22,949,562	+ 3,646,957	+ 7,706,727	+ 10,640,019	+ 855,800
Percentage of loaded to total	66·88	68·69	64·18	68·40	66·88
Wagon per train. Total	34·86	34·86	35·40	34·88	32·66
Increase (+) or decrease (−)	+ 0·49	+ 0·40	+ 0·42	+ 0·51	+ 1·01
Loaded	23·32	23·95	22·72	23·86	21·84
Empty	11·54	10·91	12·68	11·02	10·82
Train-miles. Coaching—Per train-hour	15·35	14·43	14·62	14·68	17·96
Per engine-hour	12·14	11·36	11·23	11·14	14·59
Train-miles. Freight—Per train-hour	9·32	9·70	9·35	9·23	9·08
Per engine-hour	3·73	3·45	3·88	3·86	3·12
Engine miles. Total	50,366,080	7,967,295	13,911,644	18,765,074	6,728,779
Increase (+) or decrease (−)	+ 1,533,663	+ 288,643	+ 456,242	+ 649,052	+ 88,705
Mileage run by engines. Total train-miles—					
Coaching	26,389,646	3,669,575	6,237,986	8,738,168	4,995,910
Freight	10,556,873	1,873,801	3,590,128	4,448,322	560,649
Engine-hours in traffic. Total	5,198,876	889,986	1,550,773	2,012,875	541,238
Increase (+) or decrease (−)	+ 211,543	+ 34,982	+ 65,484	+ 99,993	+ 6,989
Shunting miles per 100 train-miles—					
Coaching	7·17	6·73	6·50	7·67	7·89
Freight	70·71	82·74	66·60	64·95	96·18

Passenger Traffic Statistics: Number of journeys, receipts, and receipts per journey (excluding season ticket holders)—August, 1936

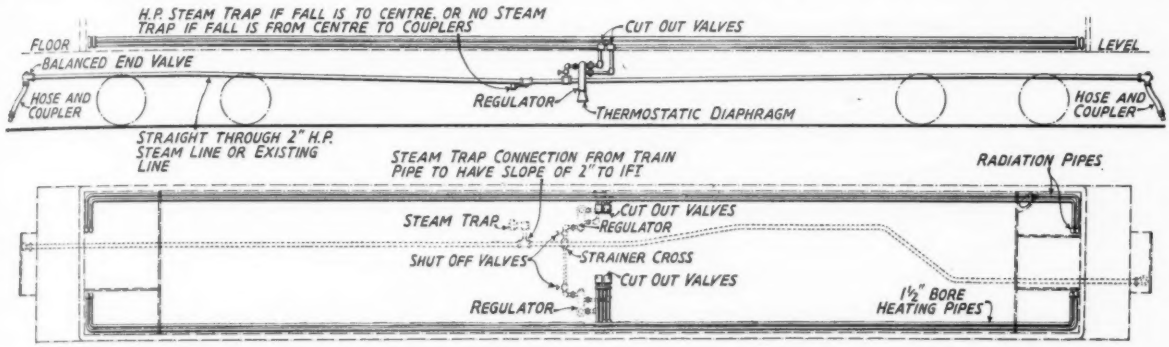
Subject	Great Britain	G.W.R.	L.N.E.R.	L.M.S.R.	S.R.	Cheshire Lines	Liverpool Overhead	L.P.T.B.†	Mersey
Full fares—									
Pass. journeys	31,020,380	883,488	1,340,808	1,785,318	3,231,361	19,725	160,435	22,565,617	86,255
Gross receipts	£1,149,074	£119,020	£197,597	£189,351	£293,480	£3,495	£1,672	£322,420	£1,552
Receipts per pass.	8·89d.	32·33d.	35·37d.	25·45d.	21·80d.	42·52d.	2·50d.	3·43d.	4·32d.
Reduced fares—									
Excursion and week-end—									
Pass. journeys	63,667,975	8,082,230	15,799,008	22,910,573	12,324,416	637,660	216,254	1,608,184	714,034
Gross receipts	£5,356,372	£864,193	£1,236,988	£2,039,787	£1,037,800	£55,017	£2,489	£41,336	£12,166
Receipts per pass. journey	20·19d.	25·66d.	18·79d.	21·37d.	20·21d.	20·71d.	2·76d.	6·17d.	4·09d.
Workmen—									
Pass. journeys	23,876,391	1,528,278	3,214,242	6,246,235	5,174,154	239,266	182,800	6,270,434	183,038
Gross receipts	£353,858	£23,390	£53,226	£102,473	£87,030	£4,284	£1,490	£70,110	£1,667
Receipts per pass. journey	3·56d.	3·67d.	3·97d.	3·94d.	4·04d.	4·30d.	1·96d.	2·68d.	2·19d.
Other—									
Pass. journeys	6,038,953	857,677	1,679,794	1,517,156	1,238,853	84,345	42,444	441,185	20,032
Gross receipts	£478,956	£78,754	£110,763	£127,245	£148,577	£4,296	£277	£3,849	£274
Receipts per pass. journey	19·03d.	22·04d.	15·83d.	20·13d.	28·78d.	12·22d.	1·56d.	2·09d.	3·28d.
Total—									
Pass. journeys	124,699,926	11,375,561	22,066,041	32,493,150	21,974,434	981,336	601,933	30,885,420	1,003,363
Gross receipts	£7,439,615	£1,112,777	£1,623,511	£2,500,892	£1,573,129	£67,447	£5,928	£437,715	£15,661
Receipts per pass.	14·32d.	23·48d.	17·66d.	18·47d.	17·18d.	16·50d.	2·36d.	3·40d.	3·75d.

* All standard gauge railways † Includes passengers originating on the railway undertakings, and on the Whitechapel and Bow Joint Railway

RAILWAY CARRIAGE HEATING

The Vapor system, manufactured by Gresham & Craven Limited, of Manchester, has been fitted to some coaches recently built by the Birmingham Railway Carriage & Wagon Co. Ltd. for service on the Chinese National Railways

ON pages 1040—1041 of THE RAILWAY GAZETTE for May 29, 1936, we published a short illustrated description of the Vapor system of steam heating for railway carriages manufactured in this country by Gresham & Craven Limited, of Manchester, which, as then stated, has many exclusive and advantageous features. As reported on page 996 of this issue a party of railway officers and others was on Thursday, December 3, invited to inspect some coaches for the Chinese National Railways now being built at the works of the Birmingham Railway Carriage & Wagon Co. Ltd., and to which this system is applied.

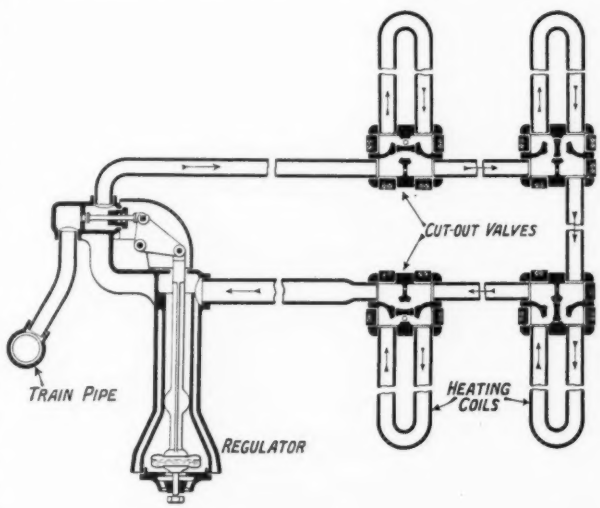

H.P. STEAM TRAP IF FALL IS TO CENTRE, OR NO STEAM TRAP IF FALL IS FROM CENTRE TO COUPLERS
CUT OUT VALVES
FLOOR
LEVEL
BALANCED END VALVE
HOSE AND COUPLER
REGULATOR
THERMOSTATIC DIAPHRAGM
HOSE AND COUPLER
STRAIGHT THROUGH 2" H.P. STEAM LINE OR EXISTING LINE
STEAM TRAP CONNECTION FROM TRAIN PIPE TO HAVE SLOPE OF 2" TO 1FT
RADIATION PIPES
STEAM TRAP
CUT OUT VALVES
REGULATOR
SHUT OFF VALVES
STRAINER CROSS
CUT OUT VALVES
REGULATOR
1½" BORE HEATING PIPES

Arrangement of Vapor steam heating equipment as applied to coaches being built for the Chinese National Railways

Supplementary to the illustrations and description already given in THE RAILWAY GAZETTE we now reproduce two diagrammatic drawings, one showing the general principle of the Vapor system and flow of the steam, and the other the application of the fittings to an open railway saloon or dining coach. The system consists of a number of properly arranged heating coils, inside the vehicle, into which may be admitted live steam taken from the train pipeline after it has first been reduced to atmospheric pressure by passing through a vapour regulator underneath the car. High pressure steam from the train line pipe is not used in the radiating pipes or in any of the valves or fittings inside the car, in which latter location only steam at atmospheric pressure is used. The absence of any high pressures in the radiating pipes is explained by the fact that the outlet system is always open to the atmosphere, hence it is impossible for pressure or condensation to be built up therein.

The temperature of steam at the outlet automatically determines or controls the amount of steam admitted at the inlet point of the system, admitting only sufficient steam to keep the outlet at 212° temperature, *i.e.*, that of steam at atmospheric pressure. This is accomplished through the use of the vapour regulators which are located outside and underneath the coach. The purpose of these fittings is to receive steam from the train pipe at whatever pressure and corresponding temperature it may happen to be at that point, and convert it into steam or vapour at atmospheric pressure, i.e., at a temperature of 212°, before it passes into the heating pipes inside the car.

Another very important feature of the Vapor system is the distribution or cut-out valve. This valve controls the admission of heat to the radiating pipes by directing the flow of atmospheric pressure steam. The valve is always placed on the atmospheric pressure side of the vapour regulator, *i.e.*, between the regulator and the heating coils, in which position it can never come in contact with steam under pressure. When the valve is open, atmospheric pressure steam from the vapour regulator enters one side of the valve and passes through to the heating pipes, returning through the other side of the valve to the vapour regulator. When on the other hand the valve is closed, atmospheric pressure steam passes directly across from one side to the other and then to the outlet of the regulator. It will perhaps further explain matters if it is stated that the cut-out valves serve to distribute the steam to heating coils and pipes when



Theoretical diagram of Vapor system

in the open position or short circuit it back to the regulator when in the closed position. The return steam from the coils and cut-out valves passes through the regulator; its temperature, acting on an expanding diaphragm, actuates the regulator and feeds steam through the regulator as and when required in exactly the necessary quantity. There is no possibility of steam escaping inside the vehicles and no irregularity in the degree of heating as separate regulators in each compartment are not employed.

The system is claimed to be highly economical in use, the only part requiring periodical attention being the special brass expanding diaphragm in the regulator which can be changed outside the car in 30 seconds. Even heating is assured and there is the further advantage of distributing heat within a very short time of turning it on, and conversely of localising the heat at the will of the operator. Provision is made for anti-freezing and drainage. Another important point is that when once installed no steam pipe joints have to be broken for renewal, repair or examination, and also that there is at no point any high pressure steam packing.

In our previous article we gave particulars and an illustration of the boiler used when the apparatus is applied to other than steam operated trains, and further illustrations were included showing the Vapor regulator and cut-out valves.

The Hell Gate Bridge

From a correspondent

WHAT was, until the completion of the Sydney Harbour bridge, the largest steel arch span (1,017 ft.) in the world, belongs to the Hell Gate Bridge of the New York Connecting Railroad, which provides the New Haven Railroad with communication to the west and south via the Long Island and Pennsylvania systems; the bridge tracks are electrified as part of the New Haven system. This interconnecting railway is not arresting in length, but in layout and execution. It is indeed rather remarkable that it was not until April 1, 1917, that there was inaugurated the first railway through New York City. Only two trunk railways have stations within the civic boundaries, *i.e.*, the New York Central—shared by the New York, New Haven & Hartford—and the Pennsylvania. The absence of a connecting link between the New Haven and the Pennsylvania systems to provide continuous communication was a great inconvenience, but proposals for closing the breach remained in abeyance until 1910. The cost of the undertaking was the restraining factor, owing to the heavy bridging involved, which included the bridging of the East River; the most attractive crossing was the reach of sinister memory in navigation annals, known as Hell Gate.

The New Haven Railroad approaches New York City from the east, bearing to the south to pass over the tracks of the N.Y.C. for some nine miles to gain the Grand Central terminus. At a convenient point the first-named was tapped by the new line—the New York Connecting Railway. It runs southwards for a short distance, and then, by a sweeping curve to the east, enters the Sunnyside yards of the Long Island Railway at the Brooklyn end of the East River tubes, giving access to the Pennsylvania station. Owing to the line traversing a somewhat densely populated district, and the difficult lie of the land, heavy bridging was unavoidable, while to preserve the grade, it was necessary to construct a considerable section upon arches. Massive concrete walls were erected forming something like a long box, pierced with openings for the streets; the space between these walls being filled in to the desired level. The first bridging occurred at Bronx Hills, a narrow stream connecting the Harlem and East Rivers. This is crossed by a bascule bridge with two lifting spans, hinged like the leaves of a book upon a masonry pier in the centre of the waterway, caissons being sunk 90 ft. below mean low-water. Each leaf is 175 ft. long, and can be lifted practically vertical.

From the southern end of this lift bridge the line is carried over a viaduct $\frac{3}{8}$-mile long, the concrete arches gradually rising until they reach a considerable height at the next water crossing—the Little Hell Gate channel. This is crossed by a bridge of the inverted bowstring truss type having four spans, each of 300 ft., with two tower piers, 155 ft. high by 10 ft. wide, and three arched piers in the channel. From the Southern end of this bridge the line is carried in a graceful curve for half a mile over a viaduct of steel girders supported on 29 concrete arch piers, bringing the railway to the east side of Ward Island, at the narrowest point of the East River, forming Hell Gate.

Shipping is heavy, and so the waterway had to be left clear. This involved building a single-span bridge—a single arch of 1,017 ft. The bridging which we have already described might be likened to approach spans to this one big span. On both banks huge towers, 250 ft. high, were built to support the steel fabric, which is of massive construction, supporting four tracks. The end members of the steel arch—which is of different design to that of the Newcastle bridge—weigh 200 American tons, while the four shoes of cast steel, which support these ends, each weigh 500,000 lb. The bridge was designed by Gustav Lindenthal in association with the architects, Palmer and Hornbostel.

Whereas in the Tyne bridge for example, the upper ribs or chords of the arch trusses are crescent shaped and are continued down to meet the lower chords at the hinges, in the Hell Gate bridge the upper ribs do not continue down to meet the lower chords, but curve out to meet vertical posts from the hinges, which, incidentally, is the method adopted in the Sydney bridge. Owing to the strong tides, currents, and broken rocky bed—and the necessity of keeping the channel clear for shipping—the arch had to be constructed upon the overhang principle. It was built out from each tower simultaneously, the weight of the steadily increasing projecting sections being counterbalanced by temporary massive steel backstays behind the towers. To economise in the cost of construction, material used for this temporary purpose was finally used in the permanent structure, after the two arms of the span had been brought together.

The two halves met on October 1, 1915; and the calculations, and method of erection, had been so accurate that there was a discrepancy of only $\frac{5}{16}$ in. across the gap. The arch—into which was worked 20,000 tons of steel—was shortly after completed, and the deck suspended from it by vertical steel hangers. As well as carrying the four railway tracks, the deck has pavements each side for pedestrians, and exclusive of the heavy concrete floor, stone ballast, sleepers and rails, represents a further 7,000 tons, and is designed to carry a load of 76,000 lb. per lineal foot. Upon reaching Long Island, the railway is carried over a further section of viaduct of concrete arch piers, to merge into the novel inverted concrete box embankment continued until the Pennsylvania yards are entered.

MODERN METHODS OF FINISHING RAILWAY VEHICLES—II

The author here treats of vitreous enamelled plates and artificial leather cloth as finishes

By H. N. BASSETT, A.I.Mech.E., Chief Chemist, Egyptian State Railways

NITROCELLULOSE paints are much quicker drying than ordinary paints, thus much reducing the time a vehicle is immobilised for painting. It is necessary, however, even with nitrocellulose paints, to allow six hours at least for hardening between the last coat and the final flatting and polishing, and an hour or more between each of the earlier coats. The primer and filler also require to harden for about six hours each. Therefore it will take three days or more to get a coach out, even when the time is reduced to a minimum and all the coats are sprayed. A process known as " wet-on-wet " is of much interest, therefore, as it makes it possible to finish a vehicle in one day and to send it out into service on the next. The process uses what is known as vigorised oil, *i.e.*, linseed oil which has been treated by a patented chemical process. This new type of oil has certain special properties, one of which makes it possible to spray coat on coat at intervals of half an hour to an hour, without any intermingling of the coats or bleeding of one through another, the whole film then drying as a single coating. The oil does not spread when placed on an absorbent surface such as paper or unprimed wood and does not dry in the usual way by oxidation, but by a chemical process of a different kind. The fact that the whole of the oil remains in the film and does not sink into the wood makes the film tougher and stronger.

When applied the films become dry to the touch in less than half an hour, but are still soft. It is possible, however, to spray on top of a wet coat without the results which would follow normally with an oil or with a nitrocellulose paint. It is better to allow at least half an hour between coats. The films when dry are tough but do not develop their maximum hardness for some days. Despite this they are hard enough for a vehicle to be put into service and will stand up to normal running conditions. It is claimed that they are less liable to damage than ordinary paint films even in the early days of their life, and they have a longer useful life than films of paint of the ordinary type. The period of final disintegration is much shorter than that of a linseed oil paint of the usual quality.

Another peculiarity of vigorised oil paints is that half an hour after application the film will stand the impact of a jet of water without damage. A vehicle could therefore be placed outside the paint shop if necessary almost immediately after completion without anxiety about the weather, a shower of rain being without effect.

The pigment content can be much higher than in ordinary linseed oil paints, so that the paints have a high obliterating power, one coat being sufficient where two have to be used normally. This effects a double economy in labour and material.

Resistance of Vigorised Paints

Vigorised oil paints possess specially resistant properties, and tests have indicated their superiority over ordinary linseed oil paints when subjected to strong cleaning media. Their value, however, apart from the considerations mentioned above—obliterating power, resistance to cleaning materials, water, &c.—lies in the fact that they are *par excellence* spray paints, making it possible to complete a repaint, if required, in a day, thus saving a great deal of time and labour. A man can spray at least six times as fast as he can brush, and as the drying is so quick and the coats can follow one another with practically no interval, floor space is occupied for the minimum length of time. Vehicles are kept out of service for a short time only. It is but fair to point out in this respect that railway vehicles rarely come in for a complete repaint, and that therefore the full saving in time which the use of vigorised materials makes possible does not arise. There is some economy, though, in the longer useful life of the coating.

Nothing has been said about colours, as each railway has its own colour scheme, but it may be of interest to record that experiments made with wooden and with steel stock showed that finishing in aluminium paint led to cooler interiors than finishing in white paint. Apart from the more or less conventional methods of exterior finishing, there are two other methods in use: (*a*) the application of vitreous enamelled plates; and (*b*) the use of artificial leather cloth (Rexine).

One obvious disadvantage of all paint and varnish finishes is that they are not permanent and require more or less complete renewal several times during the life of a vehicle. The use of vitreous enamelled sheets was a natural way out, and tests began as far back as 1924 in India. The reports received were generally favourable and various other railways, in England and abroad, have begun to test them also.

Advantages of Vitreous Enamelled Plates and Rexine

It is an essential that these sheets shall not chip or flake as, if this occurs, the whole panel must be renewed, repair being impossible. This tendency has now been reduced to a minimum by the use of special materials. Any shade and colour can be obtained except the metallic finishes—aluminium, silver, gold, bronze, &c.—and the usual markings—companies' initials, vehicle numbers, &c. —are put on the panels in the correct colours during manufacture. Panels can be obtained in any size up to the limit of successful handling, which is about 10 ft. by 4 ft.

The enamelled sheets take the place of the usual steel panels which form the bodywork of steel coaches and are attached to wooden framing in the same way. To cover the joints special mouldings are used already enamelled. Apart from the longer life, which, barring accidents, appears so far as experience goes to be the life of the vehicle, enamelled sheets possess a considerable advantage over paint and varnish in the ease with which they are cleaned. Ordinary water will make an excellent job and there is no need for special cleaning solutions. The first cost is high, but when the cost of maintenance of painted and varnished stock is added to the initial cost of the finish, it is probable that there is some advantage in the enamelled sheets.

The use of artificial leather cloth, of which Rexine is the best known type, as an exterior finish for rolling stock dates from 1928 and has extended considerably since then. Much improved cloths are now available, and the result is that leather cloth may be considered as having passed the experimental stage, and as having become a thoroughly practical alternative to paint and varnish. A criticism sometimes levelled against fabric is that it is not proof against scratches, but experience has shown that, especially in interior work, for which it is used extensively not only in railway vehicles but also motor coaches and buses, scratches are less serious than on painted and varnished surfaces. Rexine possesses another

considerable advantage in that movement of panels always breaks a paint film at mouldings unless special precautions are taken. This does not occur with leather cloth as the cloth is made with a cotton foundation which gives exceptional flexibility.

The application of the material does not present any difficulty once the technique has been acquired. Steel panels are thoroughly cleaned and then given a coating of special primer which serves to protect the panel from corrosion. A specially developed adhesive is then applied thinly to about a square yard, put on with a large stiff brush and stippled, not brushed. The adhesive is fairly slow in drying and becomes tacky in three to four minutes at ordinary temperatures. It does not harden off completely for some hours, and therefore if an error is made the cloth can be stripped off and replaced easily.

For interior work there is no need to apply either primer or size to metal or plywood surfaces, but for composition boards—Sundeala, &c.—a good coating with gold size is required which should be allowed to dry thoroughly before applying the adhesive. This prevents the adhesive from sinking into the porous surface. For large areas a rubber roller squeegee is useful as it helps to remove air bubbles: it should be worked from the centre outwards towards the part still uncovered. Special care should be taken that there are no particles of sawdust, &c., on the back of the leather cloth before it is applied. The material tends to pick up such foreign matter, and anything which adheres must be removed or it will cause an unsightly excrescence in the finished panel. For the same reason panels must be rubbed down before the adhesive is applied.

In the case of the Silver Jubilee train of the L.N.E.R. the whole of the side of the coaches was covered with Rexine, and the material over the windows cut out afterwards, moulding being applied to the edges to form a water-tight joint. This is rather wasteful of material, and satisfactory results can be obtained by using narrower material and making a joint between the panels above the waist. Cleaning Rexine-covered stock presents no problems whatever. All that is necessary is a fairly stiff brush, clean water, warm for preference, and good quality soap. Cheap soap which is highly alkaline may affect the finish adversely. Any greasy or oily patches or specially adherent dirt may be removed by using a little paraffin, but this should be washed off before the surface dries. No polishes of any kind are necessary and most of them have a harmful effect on the surface. All that is required to maintain an excellent finish is periodical washing with soap and warm water.

The interior decoration of rolling stock is carried out on much the same lines as those followed for the exterior, except that varnishes, &c., are usually of a somewhat different quality owing to the less difficult situation in which they are used. Where it is desired to preserve the original colour and grain of the woods they may be french polished, but processes have been developed, using nitrocellulose products, which give equally good results in less time at a much lower cost. The complete process sometimes involves a preliminary stain which can be applied by brush or spray. This is followed by a brushed filler which may be either oil or cellulose base. When this is dry the finishing material is applied, giving two coats, of which the first is thinned down considerably before application. This completes the process and gives a good finish, but if a still better surface is required the last coat is flatted down and a bodying liquid applied in the same way as french polish. The final mirror-like surface is obtained by polishing with wax.

Woodwork to be finished completely in nitrocellulose colours should be primed with a lead primer, brushed on and allowed to harden thoroughly. This is followed by a buffer coat, sprayed and allowed to dry for a minimum of eight hours. Then the colour coats are applied, two or more as required, allowing at least an hour between each. For a specially good finish a filler is used between the buffer coat and the colour coats, well rubbed down before the colour coats are sprayed. Woodwork which has been painted previously is washed down, stopped and filled where necessary, and then given a buffer coat and treated like new wood.

Composition boards, such as Insulwood and Sundeala, are absorbent and must be given a coat or coats of Japan gold size before any primer is applied. Alternatively an oil primer may be used, preferably two coats well thinned with genuine turpentine, followed by an oil-bound filler thinned with 10-15 per cent. of genuine turpentine. This is rubbed down with waterproof sandpaper and water, and then sprayed with nitrocellulose lacquer. For a specially good finish the final coat is rubbed down with fine paper and soapy water, and a coat of nitrocellulose thinners sprayed over the surface. This smoothes it and leaves it fit for the final polish, which is done by hand with a special polishing medium on sponge cloth.

The use of leather cloth for interior work was mentioned earlier. It possesses several advantages over paint and lacquer, not the least of which is the ease and speed with which it can be applied. The finish is a permanent one and does not chip or mark so readily as painted or lacquered panels. It has been found that polished or cellulosed garnish rails tend to chip badly in wear. At the bottom of windows there is a tendency for the strip to discolour because of the action of moisture which drains down the window and remains there. This does not happen with leather cloth, so that the general appearance of the interior is considerably improved.

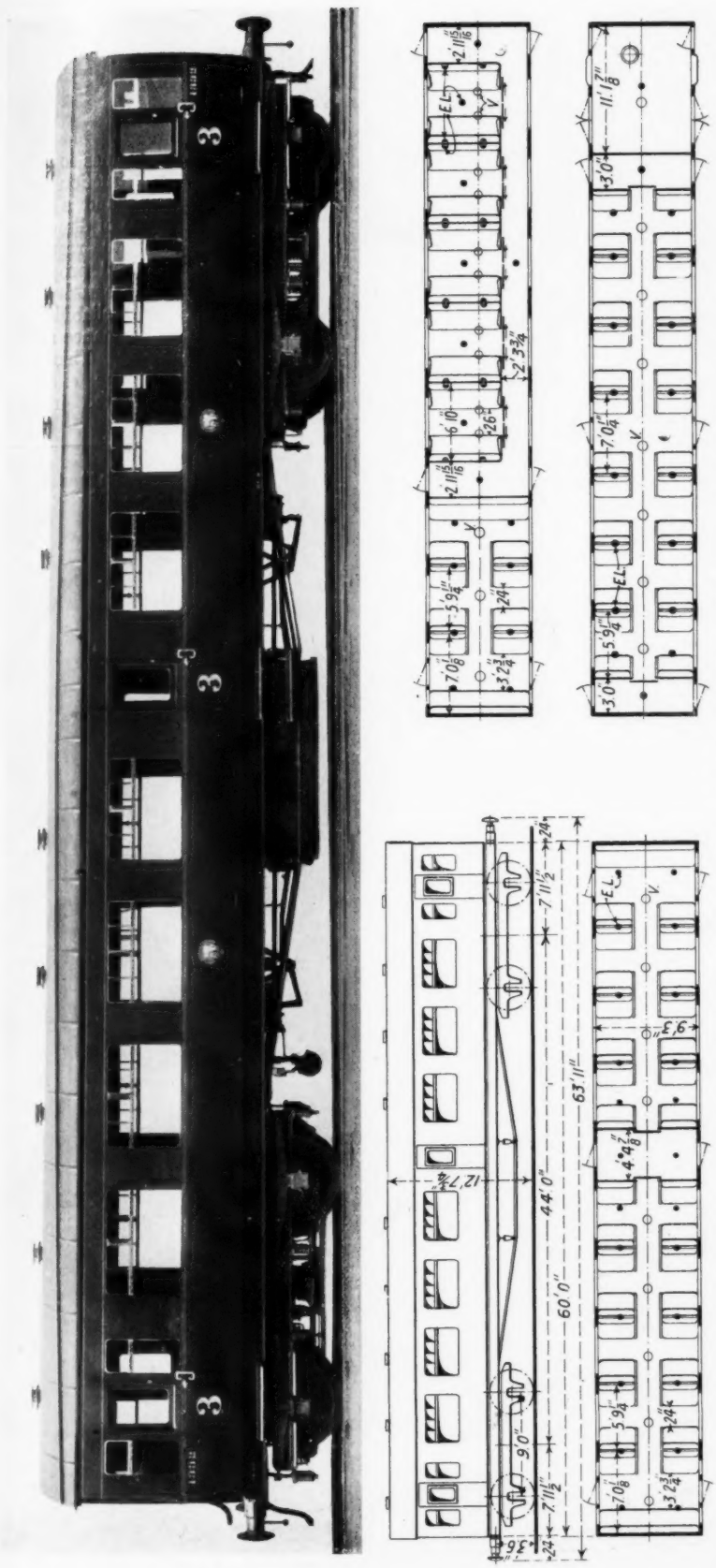
Modern rolling stock is being made up with special interior colour schemes, in some of which one colour fades into another. This is not easy to carry out with paint of any kind, but is a simple matter with Rexine, in which there are several alternative shadings. To secure an equal effect with nitrocellulose or ordinary paint would require much more highly skilled labour than for applying the leather cloth, and the cost of this work, apart from increased cost of maintenance, would be prohibitive.

New Suburban Carriages, Great Southern Railways, Ireland

These vehicles are of the side corridor type for the first, and centre corridor type for the third class

SEVERAL new carriages for suburban traffic have recently been completed at the Inchicore works of the Great Southern Railways, Ireland. They are of modern design and embrace all the latest improvements for the comfort of passengers. Three types of vehicles have been built, comprising first and third composites, thirds, and thirds with guard's and luggage compartments. Each carriage is 60 ft. long and is mounted on two four-wheeled bogies of improved design, special consideration being given to the suspension and springing arrangements. The bodies, which are carried on all-steel underframes, have sheet steel roofs, ends and sides, the latter being flush for the entire length of the vehicle. The framing carrying the steel panels is of teak; the floors, partitions and third class seat ends are on laminated block plywood.

The first class compartments are entered from a side corridor, and double sliding doors are arranged in conjunc-



New suburban rolling stock, Great Southern Railways of Ireland. The seating plans show the three types of coach

tion with the large side windows of the corridors, enabling passengers to have an uninterruped outlook. Two doors at each end of the corridor give access from the station platforms. The compartments are upholstered in two colour schemes, namely, heather and beige, and green and beige, with ivory-white ceilings; sepia-toned photographs and diamond framed bevelled mirrors are provided over the seats, half of which have Sorbo and the rest Dunlopillo upholstery. Curtains of a pleasing colour are arranged at the large side windows, and blinds on the sliding doors. The corridors are finished in two tones of green. The third class accommodation is of the centre corridor type, extra space being provided between the seats at the doorways to facilitate exit and entrance of passengers. The general colour scheme is maroon, with buff coloured panels and cream ceilings. Sepia-toned photographs and framed mirrors are fitted over seats at partitions.

The timber finishing throughout is polished mahogany, and all metal fittings internal and external are chromium plated. The floors are covered with Sorbo sponge rubber, bordered and coloured to match the general scheme, and rugs are provided in the first class compartments. The exterior is painted in the company's standard colours—crimson lake with black and yellow lining. The width of the vehicles has been increased at the waist to give more seat room. Rexine leathercloth is used in conjunction with the upholstery materials forming the colour schemes. Rotary ventilators are fitted in the roofs of all coaches.

We are indebted to Mr. A. W. Harty, Chief Mechanical Engineer, Great Southern Railways, for the above information; also for the photograph and drawings reproduced.

G.W.R. Winter Work.—During next year approximately 400 miles of G.W.R. line are to be relayed or partly renewed, and the greater part of the work, especially on the main-line routes, in the early months of next year. The work will involve the use of: 30,000 tons of new rails; 20,500 tons of cast iron chairs; 4,300 tons of bolts and fish-plates; 5,000 loads of crossing timbers; 590,000 sleepers; 190,000 cubic yards of ballast; and 1,750,000 keys. In addition, the general maintenance of stations, works, and structures will include the reconstruction of about fifty bridges.

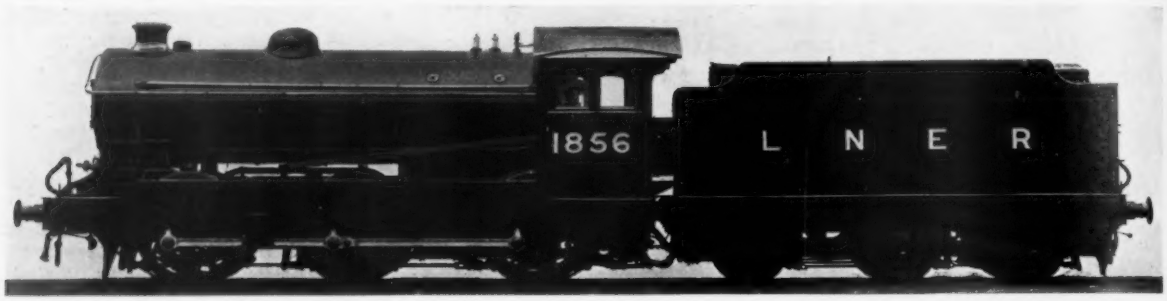
LOCOMOTIVES FOR THE HOME RAILWAYS*

Constructed by leading firms of locomotive builders during 1936

DURING the present year, orders for locomotives from the L.N.E.R. and L.M.S.R. companies have been filled by the leading British firms of locomotive manufacturers; some of these orders are still in course of execution at the time of writing. By the courtesy of the respective Chief Mechanical Engineers of the railways named, Sir Nigel Gresley and Mr. W. A. Stanier, and with the assistance of the builders, we are able to reproduce, illustrate and give principal particulars of the types of engines involved, which include designs for passenger and freight service in each case. Engines added to the existing locomotive stocks of the Great Western and Southern Railways during 1936 were in all cases constructed by the companies themselves in their own works.

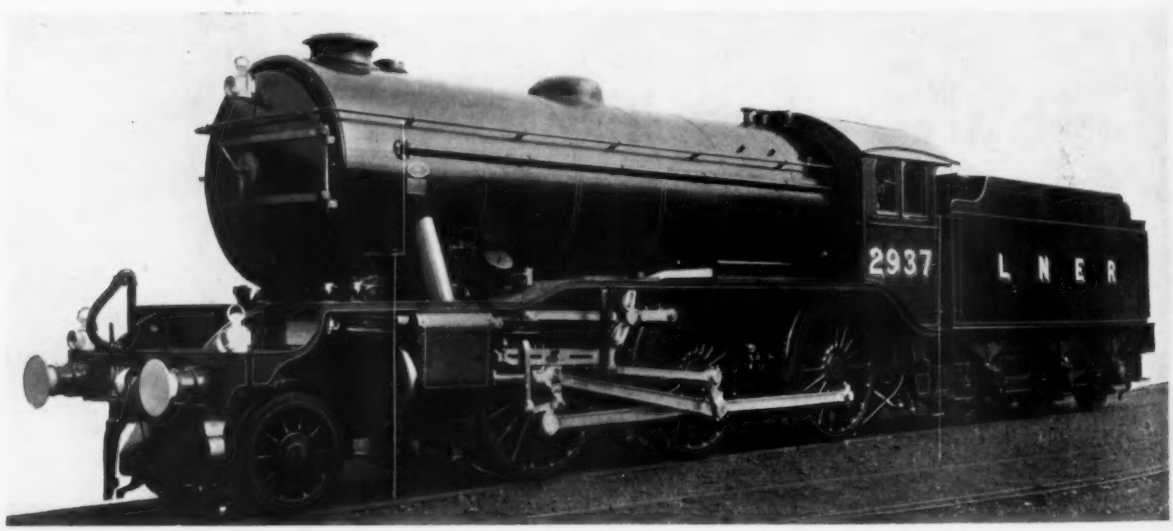
The L.M.S.R. locomotives, it will be seen, are fitted in all cases with the latest type of boiler, the mountings on which include a steam dome with the top-feed device separately mounted in front of it. The engines in general represent modern ideas of locomotive construction for use in this country, and combine a pleasing and simplified outward appearance with a careful selection of dimensions. It is, we think, safe to assert that when due regard has been paid to the limitations of weight and proportions with which they have to conform, British locomotives compare very favourably in performance and reliability with those of any other country, whilst on maintenance account they make an exceptionally good showing. This latter, and very important feature, reflects the excellence of material and workmanship incorporated in their manufacture,

* In addition to the locomotives illustrated, a series of 4-6-0 type express engines of the B.17 ("Sandringham") class is at present being constructed for the L.N.E.R. by Robt. Stephenson & Co., Ltd., Darlington.



Cylinders (2) 20 in. by 26 in.; wheels, dia. 5 ft. 2 in.; wheelbase (engine) 17 ft. 0 in.; boiler pressure 180 lb. per sq. in.; heating surface (combined total) 1,669·58 sq. ft.; grate area 26 sq. ft.; weight in working order (engine and tender) 110 tons 7 cwt.; adhesion weight 57 tons 17 cwt.; tractive force (85 per cent.) 25,664 lb. Nineteen of these engines have been placed in service

L.N.E.R.* 0-6-0, *built by Beyer Peacock & Co. Ltd.

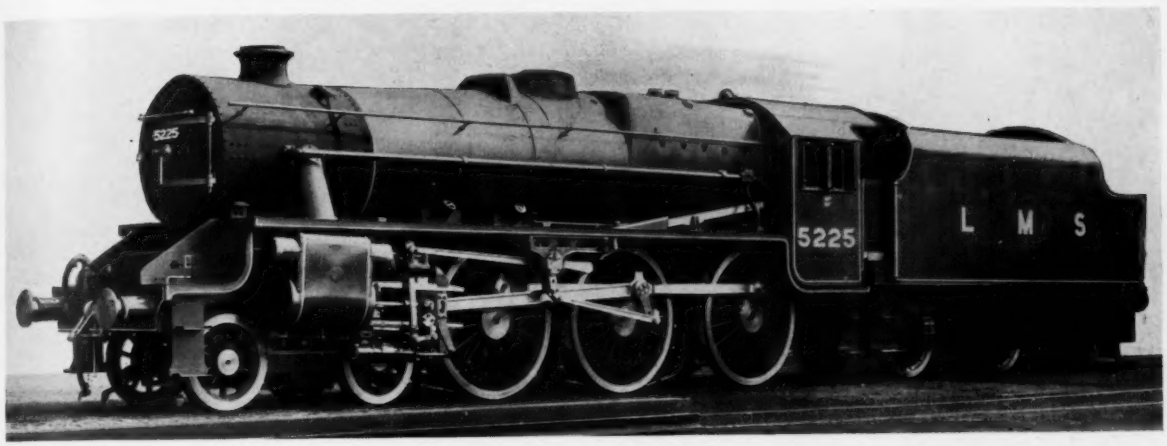


Cylinders (3) 18½ in. by 26 in.; coupled wheels, dia. 5 ft. 8 in.; wheelbase (engine) 25 ft. 2 in.; boiler pressure 180 lb. per sq. in. heating surface (combined total) 2,308 sq. ft.; grate area 28 sq. ft.; weight in working order (engine and tender) 123 tons 12 cwt.; adhesion weight 60 tons 17 cwt.; tractive force (85 per cent.) 30,031 lb.

L.N.E.R.* 2-6-0, *built by Sir W. G. Armstrong Whitworth & Co. (Engineers) Ltd.

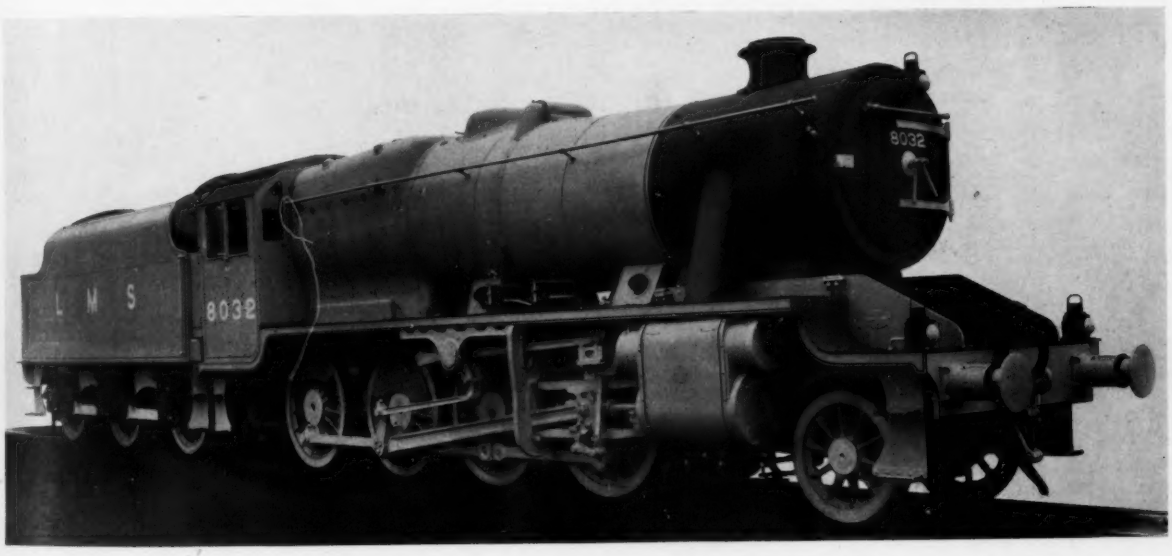
Cylinder (2) 19½ in. by 26 in.; coupled wheels, dia. 5 ft. 9 in; wheelbase 38 ft. 6 in.; boiler pressure 200 lb. per sq. in.; heating surface (combined total) 1,450 sq. ft.; grate area 26.7 sq. ft.; weight in working order 91 tons 6 cwt.; adhesion weight 57 tons; tractive force (85 per cent.) 24,670 lb.

L.M.S.R. 2-6-4, built by North British Locomotive Co. Ltd.



Cylinders (2) 18½ in. by 28 in; coupled wheels, dia. 6 ft. 0 in.; wheelbase (engine) 27 ft. 2 in.; boiler pressure 225 lb. per sq. in.; heating surface (combined total) 1,938·3 sq. ft.; grate area 28·65 sq. ft.; weight in working order (engine and tender) 125 tons 5 cwt.; adhesion weight 53 tons 3 cwt.; tractive force (85 per cent.) 25,455 lb.

L.M.S.R. 4-6-0, built by Sir W. G. Armstrong Whitworth & Co. (Engineers) Ltd.



Cylinders (2) 18½ in. by 28 in.; coupled wheels, dia. 4 ft. 8½ in.; wheelbase (engine) 26 ft. 0 in.; boiler pressure 225 lb. per sq. in.; heating surface (combined total) 1,865 sq. ft.; grate area 28.65 sq. ft.; weight in working order (engine and tender) 125 tons 3 cwt.; adhesion weight 62 tons; tractive force (85 per cent.) 32,438 lb.

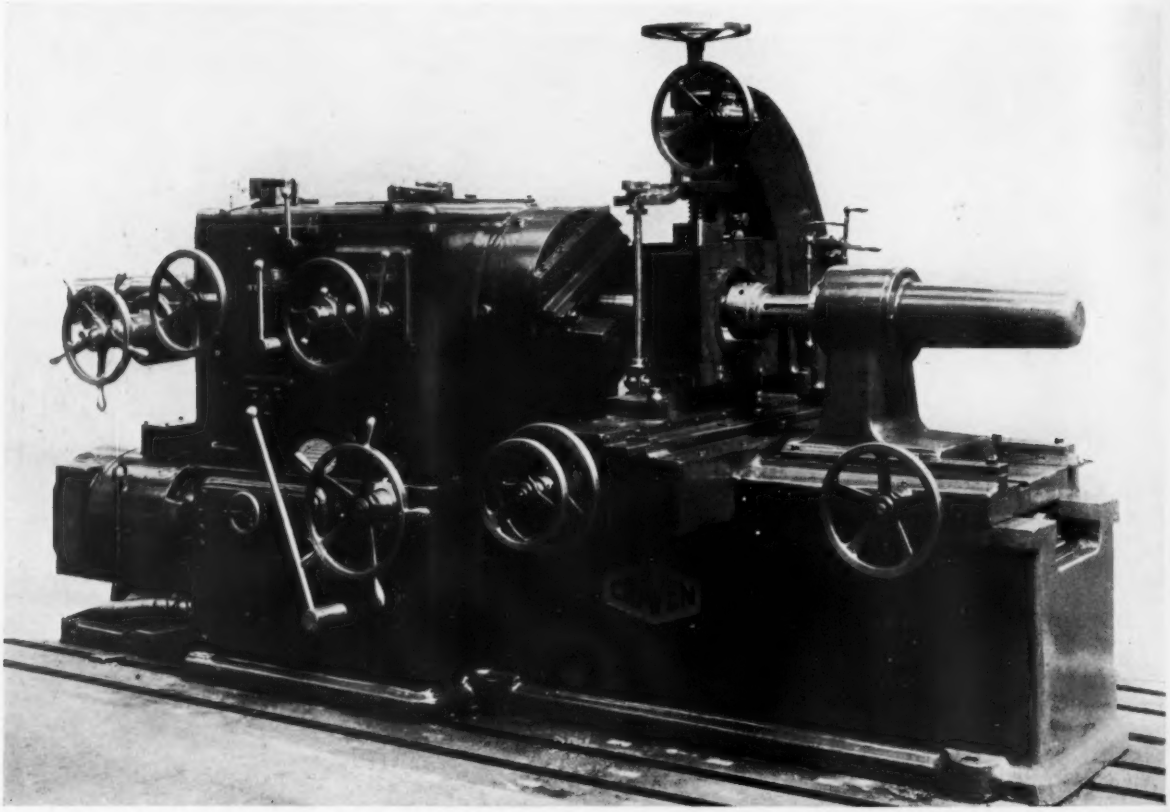
L.M.S.R. 2-8-0, built by the Vulcan Foundry Limited

XUM

A NEW MACHINE TOOL FOR RAILWAY SHOPS

Craven single-headed axlebox boring and facing machine

AN entirely new addition to the range of machine tools manufactured by Craven Brothers (Manchester) Limited, and adaptable, like so many others of the firm's products, to railway shop requirements, is the new axlebox boring and facing machine illustrated herewith. This machine is intended to deal with axleboxes which require facing on one side only; the maximum diameter that can be faced is 24 in., whilst holes ranging from 4½ in. to 10 in. diameter can be bored. The drive is by a 7½-h.p. motor, through Texropes and a friction clutch, to the all-geared driving headstock. The machine is started and stopped by a clutch lever at the front, and the operation of stopping engages a brake which quickly brings the spindle to rest.



General view of Craven axlebox machine recently supplied to the Argentine State Railways

The main spindle carrying the facing head is hollow to receive the inner or boring spindle, the arrangement being such that the facing spindle can be run separately or in conjunction with the boring spindle at speeds ranging from 8 to 90 r.p.m. In addition a fast speed range of 120 to 360 r.p.m. is provided to the boring spindle for use when finish boring with Wimet tools. The feed gears are embodied as a separate unit from the driving headstock, and provide four changes of feed to the boring spindle and three changes of radial feed to the facing head, the former speeds ranging from 16 to 250 cuts an inch and the radial feeds from 16 to 64 cuts an inch; all these feeds are reversible.

The saddle is adjustable by hand along the bed to and from the headstock, fine adjustments being obtained from a micrometer dial when putting on the facing cut. The saddle is provided with a self-contained jig with an overarm clamping bracket to receive the axlebox to be bored, which is set square and locked in position simultaneously by means of a wedge-locking strip gripping between the side flanges of the axlebox. To set the work accurately to the boring bar, vertical adjustment to the fixture as a whole is provided by a sliding wedge, and horizontal adjustment by a screw, fine movements being checked by verniers. Detachable boring bars with heads are provided, together with the high-speed steel roughing tools and Wimet-tipped finishing tools. The boring bar is supported at its outer end by a bearing having hand adjustment along the saddle, with means for locking in position. A self-contained pump in the headstock circulates oil continuously over the gears and certain other parts, whilst others again are lubricated generally by an oil gun. The machine illustrated was recently supplied to the Argentine State Railways.

New Construction Works in Manchukuo

(See Overseas letter on page 972)

Above: Site of Rashin port from the air

Left: Tunnelling and cutting works on the Yehpaishon-Chihfeng branch in Jehol Province

Right: A typical length of construction work near Taoan; note the high bridge piers and approach banks in foreground, the latter thrown up from borrow-pits on each side; also cutting work in progress beyond, leading up to the pass in the hills. As explained on pages 972–3 the cutting spoil is, for economic reasons, not used to form adjacent embankments

Left: An awkward corner on the Taoan-Solon line, where a bluff is having to be benched to enable the formation to run between it and the river. This and the illustration above give a good general idea of the different kinds of country traversed by new lines in Manchukuo

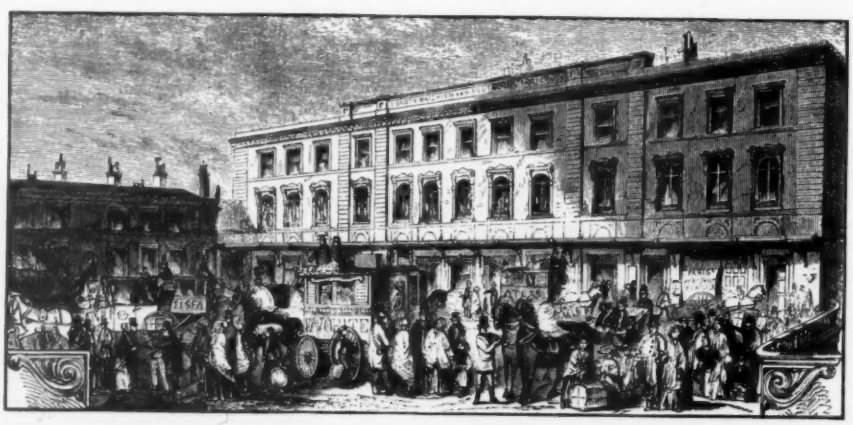
XUM

The Centenary of London Bridge Station

(*See editorial article on page* 966)

The joint station of the Brighton, Croydon, and Dover Joint Station Committee; it was built in 1844 *and demolished five years later*

View of the South Eastern station at London Bridge about 1850, *with the temporary L.B.S.C.R. station entrance on the right*



The newly-built separate terminus of the L.B.S.C.R. at London Bridge about 1853; *part of the S.E.R. building is seen on the left*

RAILWAY NEWS SECTION

PERSONAL

L.N.E.R. Appointments

The London & North Eastern Railway announces the following appointments:—

Mr. R. J. M. Inglis, Assistant Engineer, Southern Area, to be Engineer, Southern Area, in succession to Mr. C. J. Brown, who will be retiring under the age limit on January 27 next.

Mr. F. E. Harrison, Assistant Engineer, North Eastern Area, to be Engineer, North Eastern Area, in succession to Mr. J. Miller, who will be retiring under the age limit on February 27 next.

Mr. J. T. Thompson, District Engineer, Darlington, to be Assistant Engineer, North Eastern Area, in succession to Mr. Harrison.

Mr. G. Sutcliffe, District Superintendent, Lincoln, to be District Superintendent, Cambridge, in succession to Mr. H. F. Sanderson, who has recently been appointed District Goods Manager, Newcastle.

Institution of Civil Engineers

In the list of associate members transferred to the class of full member, dated November 24, appear the following names:—

Mr. J. E. S. Bodger, Way and Works Department, Ceylon Government Railway, and

Mr. D. G. MacCormack, B.Sc., Central Uruguay Railway of Monte Video and Associated Lines.

Also in the balloting list for new associate members, dated December 1, are:—

Messrs. A. F. N. Barnsdale, G.W.R.; I. F. S. MacDonald, H.E.H. the Nizam's State Railway (India); G. H. McKenzie, New Zealand Government Railways; and A. W. C. Villiers, Bombay, Baroda & Central India Railway.

Mr. J. H. Stewart, whose promotion from Staff Assistant to Assistant Superintendent (Staff) at Headquarters, South African Railways and Harbours, was reported in The Railway Gazette of July 26, 1935, has now been appointed as Superintendent (Staff).

The Secretary of State for the Colonies has appointed Mr. F. Wilson, Assistant Traffic Superintendent, to be Traffic Superintendent, Tanganyika Government Railways.

Mr. R. J. M. Inglis, M.Inst.C.E., who, as announced above, has been appointed Engineer, Southern Area, L.N.E.R., joined the North British Railway Engineer's Department as a pupil in 1898, being taken on the staff in 1900. In 1902 he was appointed Assistant Resident, and in 1903 Resident Engineer on the construction of the High Street goods warehouse, Glasgow, and yards and widenings in connection therewith. In 1905 he returned to the head office in Edinburgh, and was in charge of various large contracts under Mr. C. J. Brown, who was Chief Assistant for New Works at that time. In 1910, when Mr. Brown left the N.B.R. to become Engineer-in-Chief of the Great Northern Railway, Mr. Inglis was appointed to the position of Chief Assistant in charge of the New Works Department, and had the supervision of many contracts. In 1911 he was appointed District Engineer, Northern Division, and in 1916 was transferred to the Western Division, with headquarters in Glasgow. In 1919 Mr. Inglis was appointed Deputy Chief Engineer, Railways, at the Ministry of Transport, and early in 1921, Acting Chief Engineer; at the end of 1921 he returned to his old division in Glasgow. In 1910 he took command of the R.E. Unit of the O.T.C. at Edinburgh University, which had just been formed by Prof. Sir T. Hudson Beare, and at the outbreak of war, in 1914, Mr. Inglis, holding the rank of Captain in the Royal Engineers, T.F., immediately volunteered for service. He was appointed Adjutant to the first Training Camp for Officers at Barry under Lord Kitchener's scheme. In October, 1914, he applied for service abroad, but was recalled to the railway service owing to his position as District Engineer on the railway along the East Coast, embracing the Rosyth Naval Base and the docks at Methil and Burntisland. In January, 1929, Mr. Inglis was appointed Assistant Engineer (Permanent Way) Southern Area, L.N.E.R., becoming Assistant Engineer (Construction) in 1931 and Assistant Engineer, Southern Area, in November, 1934, the position from which he is now promoted to be Engineer of that area. Mr. Inglis is a Member of the Institution of Civil Engineers and a Fellow of the Royal Society (Edinburgh); he also holds the rank of Major in the Engineer and Railway Staff Corps, Territorial Army, Royal Engineers, to which rank he was promoted on September 24, 1932.

Mr. R. J. M. Inglis,

Appointed Engineer, Southern Area, London and North Eastern Railway

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Indian Railway Staff Changes

Mr. H. H. Cooper has been appointed Deputy Chief Mechanical Engineer, N.W.R., as from October 31.

On return from leave Mr. L. H. Swain, Deputy Chief Controller of Standardisation (Civil), Railway Board, resumed his duties on October 31.

Mr. G. St. G. Higginson on return from leave has assumed charge as Superintendent General, B.-N.R., as from October 14.

Mr. A. C. Turner, Controller of Stores, M. & S.M.R., returned from leave and resumed his duties on November 12.

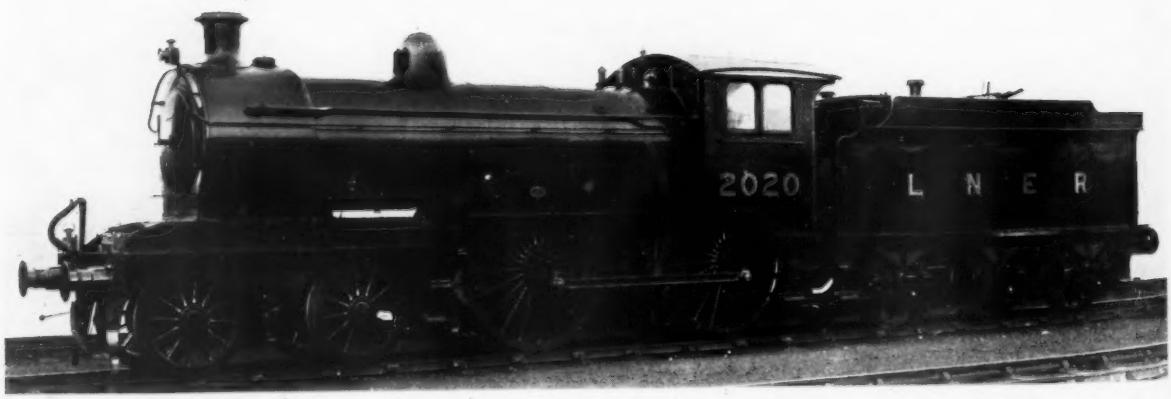
Mr. W. H. Prendergast, Deputy Agent, A.-B.R., returned from leave and assumed charge from Mr. N. H. Lewis (acting), who reverted as Deputy Chief Auditor, on November 9.

Mr. F. B. Francis, Superintendent of Stores, A.-B.R., returned from leave on October 16, and took over charge

Above : Condensing turbine locomotive on heavy express service, German State Railway

Left : G.W.R. Exhibition of Arts and Crafts : Presentation of Awards

Mrs. Charles Hambro, wife of the Deputy Chairman, G.W.R., presenting the silver cup and award of honour to Mr. T. C. Stephens. Mr. Hambro was in the chair. Among others in the group are Lord Palmer, Sir James Milne (General Manager), Sir Ralph Cope (Chief Accountant), Mr. F. R. E. Davis (Secretary), Messrs. H. Wheeler and H. Adams Clarke (Assistants to the General Manager), Mrs. Adams Clarke, Mr. G. E. Orton (Commercial Assistant to the Superintendent of the Line), Mr. R. G. Scarsbrook (Estate Assistant), Mr. S. G. Rowe (Assistant Secretary)



Rebuilt D20 class 4-4-0 locomotive No. 2020, L.N.E.R. This is the first of the well-known "R" class locomotives of the former North Eastern Railway to be modernised by the fitting of new 19 in. × 26 in. cylinders with inside admission piston valves 10 in. diameter, with $1\frac{5}{8}$ in. lap and a maximum travel of 6 in. Among other improvements may be mentioned the rebalancing of the wheels, and the fitting of cut-away splashers and a modernised cab. The weight of the engine in working order is $55\frac{1}{2}$ tons, and of the tender 43 tons

from Mr. W. C. Blake, who proceeded on leave preparatory to retirement as from October 22.

Dr. R. P. Weldon, Chief Medical Officer, A.-B.R., returned from leave and assumed charge of his duties on November 9.

L.M.S.R. APPOINTMENTS

The following appointments have been approved by the directors:—

Chief Commercial and Chief Operating Managers' Departments

Mr. C. Ree, District Runner, District Goods Manager's office, Liverpool, to be Goods Agent, Soho, from January 1, 1937.

Chief Operating Manager's Department

Mr. J. L. O'Connell, Assistant Horse Superintendent, London (Camden), to be Veterinary Surgeon, London (Camden).

Mr. W. S. Boyle, Clerk, Chief Commercial Manager's office, Euston, to be Assistant Horse Superintendent, London (Camden).

Chief Accountant's Department

Mr. F. S. Darby, Assistant (Special Matters), Euston, to be Assistant to Chief Accountant (Audit Section), Euston.

Signal & Telegraph Engineer's Department

Mr. F. J. Dutton, Assistant (Signals) Derby, to be Divisional Signal & Telegraph Engineer, Derby.

Scottish Changes

Mr. J. Cochrane, St. Rollox, to be Locomotive Foreman, Dawsholm.

Mr. E. Glendinning, Locomotive Foreman, Ardrossan, to be Locomotive Foreman, St. Rollox.

Mr. J. M. McCrae, Locomotive Foreman, Forfar, to be Locomotive Foreman, Ardrossan.

Mr. B. E. Walker, Assistant, Dock & Harbour, Fleetwood, to be Assistant to District Engineer, Irvine.

We regret to record the death, on December 6, of Lord Islington, P.C., G.C.M.G., G.B.E., D.S.O., in 1912-15 Chairman of the Indian Public Services Commission, with which State Railway men were closely concerned, and before which a number gave evidence. In 1903-4 moreover, he had been a member of the Royal Commission on London Traffic.

We regret to note the death, on December 5, of Mr. A. Matheson, D.S.O., O.B.E., Assistant Secretary in the Roads Department of the Ministry of Transport. He represented the Ministry on the London & Home Counties Traffic Advisory Committee, and did much valuable work towards the framing of the London Passenger Transport Bill and in connection with the report on Charing Cross bridge.

At its meeting on December 9, the board of directors of the Bombay, Baroda & Central India Railway Company elected Mr. S. G. S. Young to a seat on the board and appointed Mr. N. Lincoln to succeed him as Secretary.

PARLIAMENTARY NOTES

Railway Freight Rebates

In the House of Commons on December 3 the Railway Freight Rebates Bill, which had already passed through the House of Lords, was read a second time by 208 votes to 97.

Mr. Hore-Belisha, Minister of Transport, in moving the second reading, said that the Bill was necessary owing to a judicial judgment. It had been held that the valuation of the Southern Railway Company for local rates should have been £1,077,000, or 40 per cent. less than the £1,800,000 on which the company had been paying since April, 1931. It had been agreed that the liabilities of the railway companies in respect of rates should be reduced retrospectively and prospectively. As three quarters of the assessment of the companies to rates were payable into a rebates fund and thence distributed in relief of the carriage charges on selected traffics, the net results of the judgment and the agreements were that the fund was in debt to the companies for £9,750,000, and that its revenue for the current quinquennium would be contracted. No Government moneys were involved. The companies had agreed to refrain from claiming interest in respect of the past on the £9,750,000. The Railway Clearing House was to borrow on the security of the fund the amount required to discharge the fund's liability to the companies. There was in hand an accumulated balance of £1,000,000, so that stock would be issued to produce £8,750,000. As to the future annual income of the fund, it was estimated that that would be £2,300,000 instead of the £4,000,000 which it had been receiving owing to the companies contributing too much. The industries which benefited from rebates had been consulted, and coal and agriculture had agreed as to how the amount available should be distributed. The remaining selected traffics would temporarily forego their claims. The super-concentration was to be in force for seven years, and could be extended if the situation justified it till 1952.

After a short discussion, in which it was contended that the Bill was a partial way of dealing with the problem and that it would be prejudicial to the coal export trade, the second reading was carried.

On December 7 the Bill was passed through its remaining stages, and now awaits the Royal Assent.

QUESTIONS IN PARLIAMENT

The Rush Hours in London

Mr. Goldie on December 2 asked the Minister of Transport whether he was aware that statistics published by the London Passenger Transport Board showed that during the rush hours on the underground railways seating accommodation was provided for only one in every three passengers; whether he was satisfied that this was consistent with public safety; and what steps he proposed to take to ensure for every passenger the seating accommodation for which he had paid.

Mr. Hore-Belisha.—I am advised that no accidents to passengers on the board's trains have been reported in recent years as having been due to overcrowding. For the rest I will inform the board of my hon. friend's representations, which I have no power to meet.

Railways and Road Licences

Colonel Heneage on December 2 asked the Minister of Transport whether his attention had been called to the methods adopted by the railway companies in opposing applications for renewal of "A" and "B" licences and, in particular, to a case before the East Midland Traffic Commission Court, in which the applicant had already answered approximately 1,000 questions put by the railway companies; and would he consider the advisability of issuing regulations which would prevent the railway companies causing unnecessary inconvenience and expense to applicant for a renewal of licences.

Mr. Hore-Belisha.—The conduct of an inquiry into an application for a licence is a matter for the licensing authority, and Parliament has conferred rights of objection, with which it is not competent for me to interfere, on railway companies in common with other persons who provide facilities for transport.

Railway Electrification

Mr. Cassells on December 9 asked the Minister of Transport, if he was prepared, in view of the harm done by the drift south of Scottish industries, to recommend complete electrification of our present system of railways, in an effort to afford speedier and cheaper means of transport between Scotland and England.

Mr. Hore-Belisha.—I am not sure that the result which the hon. member desires would necessarily follow, but in any case the responsibility for initiating schemes for the electrification of railways rests with the railway companies.

THE BUTTERLEY CO. LTD.—After Christmas Day the address of this company's London office will be: Provincial House, 110, Cannon Street, E.C.4; telephone, Mansion House 7253.

The Travelling Post Office Service

An indispensable part of the vast organisation of the Post Office for the expeditious handling of mails is the Travelling Post Office Service, which formed the subject of a paper given on December 3 to the Railway Students' Association in London by Mr. J. J. C. Rowden, Chief Superintendent, Travelling Post Offices, G.P.O. The chair was taken by Mr. H. E. Roberts, District Passenger Manager, L.M.S.R., Euston, who deputised for Mr. W. V. Wood.

Travelling post offices (or T.P.O.'s, as they are generally called) are travelling postal sorting offices consisting of Post Office sorting carriages and mail stowage vans attached to railway trains—usually fast expresses. If in a few cases the trains can hardly be described as expresses, they are still the best trains available for Post Office purposes. T.P.O.'s vary in size from the smallest (consisting of a single sorting carriage, with a staff of two or three men), to the largest (the Up Special T.P.O., Aberdeen to London), which is a complete Post Office train consisting, over the heaviest stage of the journey, of 16 vehicles, and staffed by 50 men over that stage. All the ordinary functions of a postal sorting office are performed in a T.P.O., and—excepting parcels—all classes of postal packets are dealt with, including registered and unregistered letters of all sizes, postcards, circulars, packets, and newspapers.

History and Chief Services

The first T.P.O., which consisted of a horse-box temporarily fitted up as a sorting carriage, began running in January, 1838, between Birmingham and Liverpool on the Grand Junction Railway, six months after that line had been opened. The experiment was an immediate success, and offered such advantages in the way of accelerating the mail service, that it was decided to make the travelling post office a permanent part of postal organisation. The first specially constructed sorting van (a small vehicle 16 ft. long) was built in the same year, 1838, and although the new service had only just started, this carriage was fitted with apparatus for receiving and despatching mails while in motion.

The first T.P.O. to run from London also started in 1838 (from Euston to a point just beyond Bletchley, where the mails were transferred to the road mail coaches). Later in the same year railway extensions gave a continuous through railway route from London to Preston, and this London to Bletchley T.P.O. was extended to Preston on October 1, 1838. The establishment of the London-Preston T.P.O. was followed at intervals by others between Rugby and Newcastle-on-Tyne, Exeter and Bristol, Gloucester and Tamworth, and Chester and Holyhead.*

From these early days the service rapidly extended until the whole of Great Britain is now served by a network of more than 70 T.P.O.'s Four of the present-day T.P.O.'s (two on the L.M.S.R. and two on the G.W.R.) are special trains devoted entirely to Post Office business. These are: the Down Special T.P.O., London to Crewe, Carlisle, Perth, and Aberdeen, which leaves Euston at 8.30 p.m. and arrives at Aberdeen at 7.52 a.m.; the Up Special T.P.O., which leaves Aberdeen at 3.25 p.m. and reaches Euston at 3.55 a.m.; the Great Western T.P.O. Down, London to Bristol, Plymouth, and Penzance, which leaves Paddington at 10.10 p.m. and arrives at Penzance at 6.21 a.m.; and the Great Western T.P.O. Up, which starts from Penzance at 6.45 p.m. and reaches Paddington at 3.50 a.m. The names are those by which these T.P.O.'s are known in the Post Office—to railway officials they are known as the Down Postal and Up Postal in the cases of both the L.M.S.R. and the G.W.R.

These are only four of the principal T.P.O.'s; included in the total of more than 70 are seven a day from or to Euston, five a day from or to King's Cross, and four a day from or to Waterloo. Among the principal services are the following: the North Eastern T.P.O., King's Cross to York, Newcastle, and Edinburgh; the Midland T.P.O., Bristol to Birmingham, Sheffield, York, and Newcastle-on-Tyne; the South Wales T.P.O., Bristol to Cardiff, Swansea and Carmarthen; the Irish Mails, day and night, London to Holyhead; the South Western T.P.O., Waterloo to Basingstoke, Southampton, and Dorchester; the Highland T.P.O., Perth to Inverness and Helmsdale; and the East Anglian T.P.O., Liverpool Street to Ipswich and Norwich, with a branch to King's Lynn. These all run in both directions daily. There is one Continental T.P.O., that from Holborn Viaduct at 8.10 p.m. to Newhaven, for the Newhaven-Dieppe route to the Continent. It deals with letters for France, Italy, Spain, the south of Europe generally, Malta, Gibraltar, Egypt, and certain European colonies in Africa. There is a corresponding inward T.P.O. from Newhaven to Holborn Viaduct.

Generally speaking the correspondence dealt with in T.P.O.'s is that posted too late to secure equivalent delivery if sent from the offices of posting to a stationary forwarding office. The acceleration in delivery obtained by the use of T.P.O's is, of course, due to the fact that while the work of opening, sorting, and despatching mails is being performed, the T.P.O. is proceeding rapidly towards the ultimate destinations of the letters dealt with. Before despatch to a T.P.O. letters are divided into the divisions prescribed for each T.P.O., and the correspondence can thus be distributed to the appropriate different points in the sorting carriages. Letters for each division must be dealt with completely over a specified stage of the journey. Thus on the Great Western T.P.O. Down Mail the sorting of letters for Somerset, Gloucestershire, Herefordshire, and South Wales must be completed by arrival at Bristol; Devonshire by arrival at Exeter; one sub-division of Cornwall at Plymouth; and the second sub-division of that county at Truro.

There are numerous connections between T.P.O.'s at junction stations. In a space of just over three hours in the middle of the night, ten T.P.O.'s arrive at Crewe and ten leave that station. These have their starting and terminal points at London, Birmingham, Cardiff, Shrewsbury, Holyhead, York, Carlisle, Aberdeen, and besides connecting with one another at Crewe, they connect at other stations on their journeys with yet further T.P.O.'s running to and from other places. It is possible to travel all the way by T.P.O. from Plymouth to Helmsdale in Sutherlandshire—by means of a chain of T.P.O.'s connecting from one to the other at Bristol. Birmingham, Crewe, and Perth—with an interval of only a few minutes at each of these stations.

Carriages and Equipment

Having outlined the development and functions of the T.P.O., and the chief services now worked, Mr. Rowden described in some detail the equipment of sorting carriages and the apparatus for receiving and despatching mails while the train is travelling at speed, particulars of which have been published in THE RAILWAY GAZETTE from time to time and are therefore not repeated here. Five new Wolverton-built Post Office vehicles were briefly described and illustrated in our issue of September 7, 1934, and the work of the travelling post office in service was illustrated by a series of striking photographs reproduced in our issue of November 2, 1934.

The ordinary standard length of a sorting carriage is 60 ft., but there are a number in service ranging from 42 ft. to 70 ft. The sorting carriages are built and fitted by the railway companies according to Post Office requirements, and are maintained by the companies under contract with the Postmaster General. The charge made by the different companies for constructing a 60 ft. carriage varies from about £1,750 to about £2,500.

Staff

Travelling post offices which run direct from and to London are staffed mainly by London men, but in some cases the journeys are too long for the same staff to work right through, and staff is then provided from provincial post offices for the more distant stages. Some of the men perform return trips the same night, travelling only part of the down journey and returning to London in the corresponding up T.P.O.

* An editorial article outlining the history of the travelling post office was published on pages 370 and 371 of our issue of September 7, 1934—Ed., R.G.

Others who travel over the whole down journey, or who make a long trip which, however, may not be the entire run, stay at the town at the end of their trip and return the next night in the corresponding up mail. Staffs of travelling post offices that do not run to or from London are provided from provincial post offices. For example, the Midland T.P.O., which runs between Bristol and Newcastle-on-Tyne in both directions nightly, is staffed from the Bristol, Birmingham, and Newcastle-on-Tyne offices. In addition to the ordinary pay of their official rank, T.P.O. officers are paid a duty allowance on account of the rather exacting conditions of the work, and a trip allowance is made as compensation for the expense of lodgings and so on while away from home.

The officer in charge of a T.P.O. is usually a man of the supervising grade, but in the smaller T.P.O.'s a member of the sorting staff performs the duties of officer in charge, and is paid an allowance for doing so. All duty performed in excess of an average of eight hours a day is paid for as overtime, and any late running adds to the amount of overtime paid. For example, if the Up Special T.P.O. with its staff of 50 men arrives at Euston half an hour late, the Post Office has to pay out an extra 25 hours overtime pay. Recruitment for T.P.O. duty is on a voluntary basis, and there is no difficulty in obtaining recruits as the work (and the extra pay which goes with it) are popular with the staff.

T.P.O. Statistics

Travelling post offices in England, Wales, and Scotland deal with about 10 million letters and packets a week, or roughly 500 million a year. The total mileage run is nearly 70,000 miles a week, or about 3½ million miles a year, and the total scheduled running time is 1,880 hours a week, or about 100,000 hours a year.

NORTHERN IRELAND TRAFFICS.—Passenger receipts for the first eight months of 1936 on railways wholly in Northern Ireland amounted to £211,075, against £192,340 for the corresponding period of 1935, with an improvement from 4,188,063 to 4,383,439 in the number of passengers (apart from season ticket holders) carried. Merchandise and mineral tonnage for the eight months advanced from 359,183 tons to 410,475 tons, and the total goods traffic receipts from £119,955 to £150,692. Railways partly in Northern Ireland carried 4,075,361 ordinary passengers in the first eight months of 1936, against 4,177,317 in the first eight months of 1935, but total passenger receipts improved from £306,730 to £318,400. The quantity of merchandise and minerals carried fell from 642,351 tons to 625,506 tons, although total goods traffic receipts rose from £405,465 to £417,443. On both the purely northern and on the cross-border railways there was an improvement of about 10,000 in the number of livestock carried.

Closed Branch Lines—II (Revised)

London Midland & Scottish Railway

Earlier in this series of tables listing branch lines that have been closed, either entirely or to passenger traffic, we published one relating to the L.M.S.R. system in Great Britain (see page 387 of our issue of September 4). This table, which was based on our own records, brought forth various letters from readers suggesting that there were certain omissions in our list and also that one or two lines which we had shown as closed to passenger traffic had, in fact, now been closed to all classes of traffic. We accordingly submitted our original table and the comments thereon to the L.M.S.R., and, through the kindness of Mr. W. V. Wood, Vice-President, Finance and Service Departments, we are now able to re-publish the list in amplified form.

Section of Line (4 ft. 8½ in. gauge unless otherwise stated under Remarks)	Passenger Service Withdrawn	Section Completely Closed	Remarks
Wolverton to Stony Stratford	—	May 19, 1926	Steam tramway on public road
Langley Mill to Ripley	—	May, 1926	—
Renfrew, Deanside Goods	—	October 1, 1926	—
Distington to Rowrah	January 1, 1927	—	—
Burton to Ashby	—	February 19, 1927	Electric street tramway, 3 ft. 6 in. gauge
Congleton to Milton	July 11, 1927	—	—
Desford to Leicester (West Bridge) ...	September 24, 1928	—	—
Gilgarran branch	—	February 14, 1929	—
Harrington to Lowca	April 1, 1929	—	Light railway
Sowerby Bridge to Rishworth	July 8, 1929	—	—
Mansfield to Southwell	August 12, 1929	—	—
Halifax to Stainland	September 23, 1929	—	—
Bolton, Deansgate branch	—	February 25, 1930	—
Garstang to Knott End	March 31, 1930	—	—
Brownhills to Aldridge	March 31, 1930	—	—
Walsall Wood to Brownhills	—	March 31, 1930	—
Little Eaton to Butterley	June 1, 1930	—	—
Preston to Longridge	June 2, 1930	—	—
Lancaster to Glasson Dock	July 7, 1930	—	—
Chesterfield to Mansfield (train service via Bolsover)	July 28, 1930	—	—
Staveley to Pleasley	July 28, 1930	—	—
Pleasley to Glapwell	—	July 28, 1930	—
Denny to Bonnybridge (Denny branch)...	July 28, 1930	—	—
Denny to Bonnybridge (Bonnybridge branch)	July 28, 1930	—	—
Harecastle to Wheelock and Sandbach ...	July 28, 1930	—	—
Deighton to Kirkburton	July 28, 1930	—	—
Irvine to Kilwinning	July 28, 1930	—	—
Mansfield to Alfreton (train service via Teversall)	July 28, 1930	—	—
Pleasley to Tibshelf Junction	July 28, 1930	—	—
Caernarvon to Llanberis	September 22, 1930	—	—
Melbourne to Castle Donington	September 22, 1930	—	—
Prestatyn to Dyserth	September 22, 1930	—	—
Aspatria to Mealsgate	September 22, 1930	—	—
Holland Arms to Red Wharf Bay ...	September 22, 1930	—	—
Skipton to Grassington	September 22, 1930	—	—
Tarleton Canal Depot branch	—	November, 1930	—
Dewsbury branch	December 1, 1930	—	—
Giffin to Kilbirnie	—	December 1, 1930	—
Ayr to Turnberry	December 1, 1930	—	—
Holytown to Morningside	December 1, 1930	—	—
Airdrie to Newhouse	December 1, 1930	—	—
Walsall to Wolverhampton (via Short Heath)	January 5, 1931	—	—
Gowerton to Llanmorlais	January 5, 1931	—	—
Gillfoot branch	—	February 11, 1931	—
Eskett branch	—	February 11, 1931	—
Moor Row to Siddick Junction	April 13, 1931	—	—
Whitehaven to Workington (train service via Rowrah)	April 13, 1931	—	—
Cleator Moor to Marron Junction... ...	April 13, 1931	—	—
Donisthorpe to Nuneaton, and Shackerstone to Loughborough (Derby Road)	April 13, 1931	—	—
Strathord to Bankfoot	April 13, 1931	—	—
Audley branch	April 27, 1931	—	—
Brechin to Edzell	April 27, 1931	—	—
Kirtlebridge to Annan (Shawhill) ...	April 27, 1931	—	—
Fochabers Town to Orbliston Junction ...	September 14, 1931	—	—
Alves to Hopeman	September 14, 1931	—	—
Parton to Distington	—	May, 1932	—
Ardrossan to Uplawmoor train service (Ardrossan to Lugton)	July 4, 1932	—	—
Penygroes to Nantlle	August 8, 1932	—	—
Abbey Holme to Brayton	—	February 14, 1933	—
Waterhouses to Hulme End	—	March 12, 1934	2 ft. 6 in.
Linwood branch	—	September 20, 1934	—
Harborne branch	November 26, 1934	—	—
Sellafield to Moor Row	January 7, 1935	—	—
Bullgill to Brigham (via Dearham) ...	—	April 27, 1935	—
Leek to Waterhouses	September 30, 1935	—	—
Barrow to Piel	—	July 6, 1936	—

Locomotive Men's Claim for a Six-Hour Day

Proceedings before the Railway Staff National Tribunal

The Railway Staff National Tribunal assembled, in public, at Montagu House, London, S.W.1, on Monday last, December 7, to consider important claims submitted by the Associated Society of Locomotive Engineers and Firemen. These claims, which included one for the establishment of a six-hour working day, were estimated to involve, in respect of 71,000 men, additional wages expenditure to the extent of ten million pounds per annum.

Sir Arthur Salter, K.C.B., D.C.L., presided, and the other members of the tribunal were Mr. A. L. Ayre, O.B.E., J.P. (nominated by the railway companies), and Mr. H. J. May, O.B.E., J.P. (nominated by the trade union). Messrs. G. L. Darbyshire and G. H. Tyler sat as Assessors. The advocates were Mr. W. J. R. Squance (General Secretary, Associated Society of Locomotive Engineers and Firemen) and Mr. Kenelm Kerr, O.B.E. (Assistant General Manager (Staff), L.N.E.R., and Chairman, Railways Staff Conference).

Mr. Squance was supported by members of his executive committee, and prominent among the companies' representatives was Mr. W. V. Wood (Vice-President, L.M.S.R.).

Terms of Reference

After a preliminary statement the Chairman called upon Mr. C. F. Waters, Secretary of the tribunal, to read the agreed terms of reference. The tribunal was asked to "hear and decide" the following claims made in respect of drivers, motormen, firemen, assistant motormen and engine cleaners employed on the four main-line railways:—

Wages.—Cessation of the percentage deduction from earnings at present operating under Clause 10, Part 1, of Railway Staff National Tribunal Finding No. 1, dated July 27, 1936, and the agreement dated August 13, 1936, in regard to the deduction from earnings of male adults whose earnings for a full week do not exceed 44s. 6d.

Hours.—Drivers, motormen, firemen, assistant motormen and engine cleaners are to have a standard day of six hours and a standard week of 36 hours. Except in the case of men working their standard week of 36 hours in five long turns and one short turn, no rostered turn of duty to exceed six hours. Spreadover turns of duty shall not be worked by drivers, motormen, firemen, assistant motormen and engine cleaners. Cancellation of the provision for an extension of rosters, where economy will accrue, up to 9 hours a day.

Sunday Duty.—All time worked between midnight Saturday and midnight Sunday to be paid for at the rate of double time, with a minimum payment of a standard day's pay for each time of signing on duty. Turns commencing on Sunday extending into Monday to be treated as Sunday turns and to be paid at the above rate throughout and exclusive of the guaranteed week.

Good Friday and Christmas Day (England and Wales), January 1 and 2 (Scotland).—All time worked on these days to be paid for at the inclusive rate of double time, the extra allowance of time worked to be paid for in addition to the payment for the guaranteed day.

Overtime.—All time worked on weekdays in excess of the standard hours to be paid for at the rate of time-and-a-half, or, if between the hours of 10.0 p.m. and 4.0 a.m., at the rate of double time.

Night Duty.—All ordinary time worked between 10.0 p.m. and 4.0 a.m. to be paid for at the rate of time-and-a-half. All overtime worked between these hours to be paid for at the rate of double time.

Holidays.—After 12 months' service two weeks' holiday—twelve week-days—with full pay to be given.

General.—All other conditions of service covered by existing agreements, but not concerned or affected by these proposals, to continue.

Claimants' Main Arguments

The following main arguments were submitted, in writing, in support of the claims:—

That satisfactory salaries, wages and conditions of service commensurate with training, skill, responsibility and fitness required correctly to fulfil the necessary duties to be performed to be the first charge on the industry.

That when the National Agreements were negotiated in 1919 they were recognised as fair value for the labour and service of footplate men, electric motormen, drivers of petrol trains, *i.e.*, men employed in the line of promotion for enginemen.

That the deductions and variations decided upon in National Wages Board Finding No. 119 were accepted to meet what was regarded as a period of national urgency and were therefore of a temporary character.

That since 1919 the duties and responsibilities of the men in the line of promotion have been tremendously increased.

That modern methods, rationalisation and speeding up generally have made these duties much more onerous and exacting.

That a further result of speeding up and new methods has been the retarding of promotion.

That these modern methods, applied during periods of depression, have created such redundancy of staff that, in accordance with existing agreements, footplate men have been put back in grade and thousands have been dismissed the service.

That in this putting back in grade heavy reductions in wages to the employees concerned automatically apply, in addition to those operative under National Wages Board Finding No. 119 of March 5, 1931, which fell heaviest on the footplate grades.

That this combination of circumstances is causing much hardship and consequent dissatisfaction amongst the staff who greatly feel the pressure of modern requirements.

That the increased duties and responsibilities accepted by the footplate men since 1919 and performed with excellent credit and proficiency, merits a higher remuneration than the conditions of service, wages and hours accepted as fair value for the duties required of them in 1919.

Main Grounds of Companies' Opposition

A memorandum had been prepared by the companies setting out their main grounds of opposition to the claims. The first part of the document dealt with "general considerations." The interest of the claimants in these matters is not sole but joint. The decisions and agreements determining these matters apply not only to the claimants but to other parties as well. The negotiations on these matters have throughout been joint negotiations of all the interested parties, until the claimants at the last stage took separate action.

The additional claims now submitted, since they involve conditions of service more costly than those provided by the national agreements, are in direct conflict with Decision No. 1 of the tribunal, inasmuch as that decision continued to the companies part of the relief from the requirements of the national agreements which was originally awarded by National Wages Board Decision No. 119 in order to meet the difficult financial position of the companies.

The present claims, whether a repetition of claims already decided or additional claims, constitute an attempt to break through the recent Decision (No. 1) of the tribunal that the rates of pay and conditions of service as varied by that decision shall be operative "to the first full pay following August 15, 1937."

The claims now submitted in respect of three only of the many grades in the railway service are estimated to cost nearly ten million pounds a year. The additional claims which account for the bulk of this cost, are in respect of conditions of service (standard hours of duty; rates of pay for night duty, overtime, and Sunday duty; and holidays with pay) which are directly applicable to the whole of the conciliation staff, and are related to corresponding conditions of other sections of railway staff. Apart from the additional financial burden, the conditions of service now claimed would gravely hamper the railway companies in their duty of meeting the requirements of trade and industry and the travelling public.

In short the railway companies urged that the claims now submitted are unfounded on merits, are unreasonable in relation to the financial position of the industry, and on every count are in conflict with the recent Decision (No. 1) of the tribunal.

Companies' Answer to Union's Arguments

The second part of the companies' formal documents sets out answers to the several arguments of the Associated Society as stated in its formal statement of claim. Remuneration of the

employees is, in fact, a first charge on the industry and the adequacy of the level of the remuneration and of the conditions of service is proved by the fact that they were originally determined by agreements voluntarily accepted by the unions, and that all subsequent variations have been either agreed or awarded by appropriate tribunals. The companies noted that the claimants recognise the provisions of the national agreements of 1919/1920, as "fair value for the labour and service of footplate men" at that time.

The negotiations which led to those agreements, however, were conducted on behalf of and under the instructions of the Government, which was then in merely temporary control of the railways; and the negotiations, moreover, were conducted in the light of the circumstances then obtaining, and in the atmosphere of the period immediately after the war. Since then, on the one hand, the cost of living has fallen in a very marked degree, with the result that there has been a very material improvement in the level of "real wages"; and, on the other hand, the economic position of the industry has worsened, with the result that the level of remuneration fixed in 1919/1920 has become a much more onerous burden upon the companies. Further, the companies have previously contended, and still maintain, that certain of the provisions of the national agreements are unduly restrictive in character, and hamper the management in discharging its obligations to the public.

When it was demonstrated by the companies that the relief granted to them by National Wages Board Decision No. 119 in March, 1931, following negotiations commencing in November, 1930, had no relation to the national emergency which arose in September, 1931, it was also demonstrated that the relief, though temporary in character, inasmuch as it was in essence conditional upon and directly related to the then financial position of the companies, was granted for a purpose rather than for a period, and that the period of operation was not limited.

The railway companies do not accept the contention of the society that since 1919 the duties and responsibilities of men in the line of promotion have been tremendously increased or that modern methods, rationalisation and speeding up generally have made these duties much more onerous and exacting. Neither do the companies accept the argument used by the claimants as to the causes of retardation of promotion and of redundancy. Such retardation and redundancy as have occurred have been due in the main to widespread and long continued depression in trade and the consequent diminution of traffic.

The effect of this depression was not confined to the grades concerned in the present claim, nor indeed was it confined to the railway industry. The application of modern methods has enabled the companies to retain traffic, recover traffic previously lost, and gain new traffic, thereby limiting the effect of trade depression upon employment.

The statement made by the claimants that these modern methods, applied during periods of depression, have created such redundancy of staff that, in accordance with existing agreements, footplate men have been put back in grade and thousands have been dismissed the service was stated to be very misleading, it being explained that the periods of depression, admitted in the statement, forced upon the industry the necessity of adopting new methods and effecting every possible economy. The statement of the society itself indicates that the necessity for putting back in grade was foreseen and provided for in the national agreements, and has been effected in accordance with those agreements.

The question of discharge of staff in order of juniority was fully dealt with in the proceedings leading to the tribunal's Decision No. 1. It was shown that the measures for keeping the discharge of staff to an absolute minimum are thorough and efficient, and that every endeavour is made to avoid hardship. No man is discharged from the grades concerned in the present claim except from the lowest or starting grade, that of cleaner. No man is discharged who is not at the time the junior man in the line of promotion within the appropriate area. All men so discharged are insured under the Unemployment Insurance Act. The majority of such men have in fact already been re-absorbed in seniority order and credited with their past service.

The companies drew attention to the fact that in other industries men not required would not merely have been put back in grade but would have been discharged. Redundant drivers and firemen have been retained, although on work of less value, and they have received remuneration appropriate to the work actually performed, or higher remuneration.

If it were the suggestion of the society that the procedure in regard to redundancy pressed specially on the footplate grades, this was denied by the companies as, on the contrary, the footplate grades are already in a privileged position in comparison with the other conciliation grades. If it were meant that the general reductions under National Wages Board Decision No. 119 "fell heaviest on the footplate grades" this merely reflects the fact that the earnings of these grades are high in comparison with those of other grades.

The companies do not admit that "the combination of circumstances" mentioned by the claimants is causing any avoidable hardship and the companies contest the statement that the present level of remuneration and conditions of service are not commensurate with the duties and responsibilities of footplate staff.

Mr. Squance's Speech

Mr. Squance's speech occupied the whole of Monday, December 7. With regard to the major item of his claim he said that the principle of a six-hour day was agreed by his society's delegate conference as long ago as 1919, although such a claim was not actually put forward to the railway companies until this year. He argued that a reduction of the hours of work would give greater leisure to the workers and do much towards alleviating the unemployment problem. He referred to the desire expressed in other industries and other countries for a shorter hour week and, in this connection, he cited instances in Italy, America, France, New Zealand and even Poland.

In support of their desire for a six-hour day he claimed that the duties of enginemen had become more onerous and more exacting and that the greater responsibilities of the men demanded more concentration while he submitted that more physical and mental energy were expended. Mr. Squance recognised that a huge cost was involved in the claims but he suggested that an increased measure of goodwill and efficiency on the part of the staff would make this cost worth while, and he submitted that if the claims failed then nothing short of national ownership and control of all forms of transport should be seriously considered.

Mr. Kerr's Speech

On Tuesday, December 8, the railway companies' spokesman, Mr. Kenelm Kerr, opened the case in opposition to the claims. He suggested that Mr. Squance had over-coloured the difficulties and drawbacks of an engineman's life, and had omitted to give credit to those who designed and built the engines, who designed, constructed and maintained the track and the signalling, and, not least, to the proprietors who had invested their capital in such a useful undertaking as the British railways—an industry which would not exist but for that capital.

Mr. Kerr then gave a comprehensive review of the financial aspects, reminding the tribunal that the financial information published in regard to British railways provided more statistical and financial detail than was published in regard to any other industry. He drew attention to the fact that the companies' position was very fully discussed before the tribunal in July last and the results of that discussion were published in Decision No. 1. He said the gross railway traffic receipts for the year 1936 would probably show an increase of about £5,000,000 on the 1935 figures, but the 1936 figures included receipts on the extra working day for leap year, representing about £500,000. On the expenditure side, the higher cost of coal was an adverse factor, accounting for an increase of some £540,000. The effect would be greater in 1937, after the dropping out of present continuing contracts. In a full year, the 1935 quantities of coal and materials,

if obtained at present prices, would involve an increased expenditure of £2,000,000. Mr. Kerr estimated that the effect of the rating decisions and adjustments would show an advantage to the companies of £2,275,000 a year. Regarding the question of over-payments in the past the position in relation to local authorities was still not ripe. He submitted the companies had still a serious leeway to make up before even the level of 1929 was recovered, and he urged that the companies ought not to be obstructed—as they would be if the society's claims were granted—in making up that leeway.

Mr. Kerr made a very strong case against the six-hour day, pointing out that the trade union would not have the responsibility for operating it, neither would it have the responsibility of paying for it. The claim ignored the fundamental fact that transport was the servant of industry and of the public and must adapt itself to their requirements. There were many restrictive existing conditions of service of enginemen which hampered the companies in arranging their services to meet the requirements of the traffic, and he declared that it was really impracticable to restrict the railway industry to a six-hour day. For the three grades concerned in the present claim the additional wages cost of a six-hour day was estimated at ten million pounds, while if the application was extended to cover all railway staff the cost would be fabulous. If the railways were crippled as a commercial undertaking it would have the inevitable result of crippling their power to offer employment. The economic structure of the country—production, trade and the travelling public—could not bear such a burden as was implicit in the society's claim for a six-hour day.

Mr. Kerr then dealt in detail with the other items of the claims, namely, overtime, night duty, Sunday duty, and holidays with pay, and gave answers to various arguments which had been advanced by Mr. Squance as to hardship suffered by enginemen by reason of pay cuts and increased responsibilities. There appeared to be a good deal of misunderstanding about the "arduous nature" of the duties of enginemen, and he proceeded to instance many examples of improvements in locomotives, track, signalling, &c., which, he urged, should be offset to the tendency complained of by the society towards an increase in responsibilities. Mr. Kerr then dealt fully with the difficulties of staff work and rostering and of relieving, and described how the companies had set up systems of traffic control, and he submitted copies of train working diagrams to illustrate the complexity of the problems of railway traffic operation and the great care and thought devoted by the management to their proper solution.

Dealing with the question of the proper remuneration of labour Mr. Kerr gave the following percentages of increases in wages above those which prevailed before the war:—

	Rates of pay	Earnings
Drivers	113	130
Firemen	163	181
Adult cleaners ...	165	158

These increases were accompanied by a reduction of hours by one-fifth.

The present cost of living index number was only 51 per cent. above pre-war, and he submitted there was a substantial betterment in "real wages," viz.: drivers 52 per cent.; firemen 86 per cent.; adult cleaners 71 per cent. There had been criticisms of pre-war level of wages being used as a basis, but nearly all rates and conditions were settled by arbitrators, tribunals, or agreements with the knowledge of surrounding circumstances, and it might be taken they were not hopelessly out of step with their surroundings of the same date. There was also a substantial betterment in "real wages" if the present position were compared with that in 1919 when the National Agreement was made, namely: drivers 42·1 per cent; firemen 51·2 per cent.; adult cleaners 34·6 per cent.

When Mr. Kerr had sat down at the end of his speech Sir Arthur Salter asked for certain statistics indicating any changes in the companies' financial and economic position since the issue of the tribunal's Decision (No. 1) on July 27 last.

The Tribunal met again on Wednesday, December 9, when Mr. Squance replied to various points which had been made by Mr. Kerr in presenting the case of the railway companies in opposition to the claims.

At the conclusion of Mr. Squance's remarks Sir Arthur Salter announced that the public proceedings would be adjourned until Saturday, December 12, when questions would be put by the members of the tribunal, with the object of elucidating certain matters which had arisen during the three-day hearing.

Welsh Inter-Railway Ambulance Competition

Possession of the "Harry Webb" Challenge Cup, the competition trophy of the Priory for Wales, was keenly contested at the Welsh Inter-railway competition, held at the City Hall, Cardiff, on December 1. Six teams participated in the contest, three from the L.M.S.R. and three from the G.W.R.

Among the interested spectators were the Lord Mayor of Cardiff (Alderman H. Hiles, J.P.), who was accompanied by the Mayoress. Others present were: Mr. N. L. Wallis, District Engineer, L.M.S.R., Abergavenny; Mr. J. Storey, Assistant Superintendent, L.M.S.R., Abergavenny; Mr. A.W. Hamer, Assistant District Goods and Passenger Manager, L.M.S.R., Swansea; Mr. E. V. Swallow, Deputy Chief Docks Manager, G.W.R.; Mr. A. R. Beatt, Dock Manager's Office, Cardiff, G.W.R.; Mr. F. George, Docks Department, G.W.R., Barry; Miss C. A. Ault, G.W.R. Ambulance Centre Secretary, Paddington; and officials of the St. John Ambulance Brigade.

The tests set were chiefly of a railway character, and the adjudicators were Major A. W. Anderson, Assistant Surgeon in Chief for Wales, S.J.A.B. (team work); Dr. J. M. Wilson and Dr. N. M. Lewis (individual and practical work). Presiding over the subsequent proceedings, the Hon. John Bruce, Principal Secretary of the Priory for Wales, congratulated both railway companies on the progress of the ambulance movement on their systems and the proportion of trained ambulance staff. He announced the result of the contest as follows:—

	Total marks
1. Brynmawr, L.M.S.R. ...	271
2. Fishguard Harbour, G.W.R.	269
3. Aberdare, High Level, G.W.R.	264
4. Swansea Victoria, L.M.S.R.	257
5. Llandudno, L.M.S.R. ...	254
6. Pontypool Road, G.W.R. ...	250

The presentation of the cup and prizes to the winning team was made by the Mayor, and the runners-up, Fishguard Harbour, the previous holders of the trophy, received the prizes from the Mayoress. The Mayor congratulated the Brynmawr team on wresting the trophy from the Great Western Railway, which had held it since 1932, and spoke of the value of first-aid training to all members of the community. Major Anderson, who gave some sound and constructive criticism to the competitors, said that the standard was excellent and a considerable improvement on the work of a few years back. A vote of thanks to the adjudicators was passed on the motion of Mr. Storey.

B.S.S. Cartridge Fuses for Railway Signalling Circuits.—This specification, just issued by the British Standards Institution, is one of a series for materials and apparatus used for railway signalling. It is also one of a series of specifications for electric fuses. The manufacturer of the complete cartridge is not tied down to specific materials, being in this respect subject only to the clause that, whatever the material, it shall have no deleterious action on any part of the fuse during its life. The general construction of the fuse has not been stipulated, but the capping and overall dimensions have been rigidly standardised in order to ensure interchangeability. Definite performance limits have been laid down for voltages up to 250 volts. The experimental data for 650-volt fuses are not at present sufficiently advanced to allow of performance limitations being laid down for this voltage. The specification is therefore incomplete from this point of view, though dimensions have been laid down. Copies of this specification (B.S.S. No. 714—1936) can be obtained from the British Standards Institution, 28, Victoria Street, London, S.W.1, price 2s. 2d., post free.

XUM

British Railway Stockholders Meeting

Sir Charles Stuart-Williams, Chairman of the British Railway Stockholders Union Limited, addressing members at the general meeting on Wednesday, dealt at some length with the restoration of wage cuts, and the House of Lords decision on railway rating. Having outlined the wages award of the Railway Staff National Tribunal of July 27 this year, he mentioned the further claim of the Society of Locomotive Engineers and Firemen now being considered, and pointed out that the additional expenditure of between nine and ten million pounds involved did not take into account consequential increases that might be asked for by other staff were this claim to succeed.

Discussing local rating, he said that the actual gain, or reduction in expenditure, which the railways would enjoy as a result of the new assessments, had been quoted to him as about £2,275,000. Large sums (probably between £9 and £10 million) were due to the companies as refunds of amounts paid under protest since the new Act had come into force, and many would welcome a decision by the boards that the money available should be so treated as to inure mainly, if not altogether, to holders of junior stocks, who had suffered during the last six years by its being witheld.

The future seemed brighter as far as reviving trade at home and abroad was concerned, but the railways had to face increased payment on account of wages, coal, and other commodities. There was also road competition, and it had to be remembered that two-thirds of the traffic on the roads consisted of private vehicles. In this direction the railways could compete only by a combination of economy and efficiency that would divert such traffic to themselves, a task necessarily of great difficulty.

Mr. W. E. Sutcliffe, a member of the union, said that he thought a substantial saving could be achieved if the L.N.E.R. and L.M.S.R. companies were unified, not so much in management as in finance, so that there would be no chance of rivalry between the two. He also considered that coal was the most disappointing item in the weekly traffics, and asked whether the railways were getting their share of new business of this kind arising from the reported revival in industry.

Mr. Ashley Brown (General Secretary), answering these and other remarks, pointed out that already 75 per cent. of the total income of the four main-line companies was pooled. Pooling gave all the advantages of unification without that great disadvantage of having an enormous concern that no one man could manage. He explained the disappointing coal results by the very poor export trade, which had cut long haul traffic to ribbons. The adoption of larger wagons was very strongly advocated by the union, and they were hammering that point at the companies all the time. He was glad to say that membership of the union was increasing.

G.W.R. Debate on Goods Transport

The Paddington and Birmingham G.W.R. Debating Societies held a joint debate at Birmingham on November 23, when they discussed the motion, moved by the London society, "that the transport services offered by the British railway companies are adequate for industrial requirements." The speakers were, for the London society, Messrs. D. H. Hawkeswood, of the Chief Goods Manager's office, and G. V. Kelley, of the office of the Superintendent of the Line; and, for the Birmingham society, Messrs. P. F. Glendon and G. O. Richards, Goods Agent and Stationmaster at Bilston.

The case put forward in support of the motion included reference to the accelerated freight train services now available for all traffics between large industrial centres, and the resultant high percentage of through-load traffic which receives a next-day delivery; the still speedier transit accorded to parcels traffic; the development of containers; the improvement and extension of collection and delivery services; the establishment of country lorry services; the provision of improved handling devices and of increased warehousing facilities at depots; and the adoption of "cash on delivery" facilities. There was a real desire on the part of railway companies to understand the point of view of traders in regard to transport requirements, and to make their services comprehensive in scope and efficient.

Criticisms advanced by the Birmingham speakers were more particular than general. There was, however, a suggestion that the provision of new services and facilities was inclined to lag behind demand rather than to anticipate it. A good general discussion followed the opening speeches, but owing to pressure of time the Chairman (Mr. C. Rayner-Smith, Assistant Divisional Superintendent) did not put the motion to the vote of the meeting.

Railway Bills in Parliament

In addition to the notices of Bills to be promoted by the Great Western and Southern Railway Companies, to which we alluded last week, notices of Bills have now been published by the London Midland & Scottish and London & North Eastern Railway Companies and by the London Passenger Transport Board. The L.M.S.R. Bill, of which an abbreviated notice is published on page 1000, provides for construction of archways under a road and closing of a level crossing at Morecambe, for acquisition of lands, for extension of time for compulsory purchase of lands, and for modification of dues, rates, and charges at Holyhead Harbour. It also proposes to re-enact with or without amendment the company's powers relating to holding, selling, disposal, and building on or over its lands. In the L.N.E.R. Bill, of which a notice appears on page 1000, provision is made for construction of a short railway (4 chains) in West Ham, a widening (2 furlongs 4 chains) in Ilford, and a subway at Barnet. Stopping up of certain footpaths and level crossings, and acquisition of lands is also provided for. Confirmation is sought of an agreement with the Trent Navigation Company as to leasing and sale of part of the Nottingham Canal. The London Transport Bill contains many points of general interest including the power to enforce the queue system at stopping places of buses, &c., new regulations as to passengers' luggage, relief from the obligation to provide first class accommodation in certain carriages, and to carry animals (except dogs) or goods (other than passengers' luggage) in passenger trains. New railway construction includes an extension (2¾ miles) of the Morden-Edgware tube in the direction of Elstree, and a railway (3 furlongs) at Amersham to provide for the reversal of trains.

SOUTHERN RAILWAY WINTER SPORTS POSTER.—At this part of the year the boat train departure platform at Victoria becomes an outpost of Switzerland—a first rendezvous for those who, in a few hours' time, will be negotiating snow and ice with skis and skates, instead of goloshes and an attaché case. Austria, too, has become a popular resort for winter sports, and there are fast connections with both countries via Southern Railway expresses and cross-Channel steamers to Dieppe, Calais, or Boulogne. The times of departure from London are shown on a new poster issued by the company, the design of which, expressed predominantly in deep blue contrasted with red, shows a girl in ski-ing costume.

XUM

RAILWAY AND OTHER REPORTS

Metropolitan Railway Country Estates Limited.—The directors propose to pay a dividend of 5 per cent. for the year ended October 31, to transfer £15,000 to general reserve, and to carry £32,330 forward. For the previous year 5 per cent. was paid, £10,000 placed to reserve, and £31,275 carried forward.

Rohilkund & Kumaon Railway.—A final dividend for the year ended September 30, 1936, of 6 per cent., together with a bonus of 5 per cent. on the ordinary stock, is recommended, making with the ad-interim dividend and bonus of 7 per cent. paid in July, 1936, a total payment of 18 per cent. per annum. The dividend and bonus now announced will be payable, less income tax at 2s. 7d. in the £, on January 25, 1937. For the previous year the total distribution was 16 per cent.

Bengal & North Western Railway.—The board has recommended a final dividend for the year ended September 30, 1936, of 7 per cent., together with a bonus of 3 per cent. on the company's ordinary stock, making with the ad-interim dividend and bonus of 8 per cent. paid in July, 1936, a total of 18 per cent. per annum. The dividend and bonus will be payable, less income tax at 2s. 7d. in the £, on February 1, 1937. For the year 1934-35 the total distribution was 16 per cent.

Paraguay Central Railway—Gross receipts for the year ended June 30, 1936, were in Paraguayan currency $127,385,553, an increase of $52,048,010, and working expenses were $92,044,581, an increase of $36,990,998, leaving net receipts higher by $15,057,012, at $35,340,972. In sterling, net receipts amounted to £25,872, an increase of £9,066. By the addition of sundry credits amounting to £10,618 the revenue for the year is brought up to £36,490. This covers the £36,000 interest due on the 6 per cent. prior lien debenture stock, but leaves only £490 towards meeting the £17,500 interest due on the 7 per cent. "A" debenture stock, making the deficit on net revenue account for the year £17,010. The increase in gross receipts was mainly due to revisions of tariffs, offsetting, to some extent, the depreciation of Paraguayan currency and increases in salaries and wages.

Scottish Motor Traction Co. Ltd.—The report of this company, in which the L.M.S. and L.N.E. Railway Companies have each a large shareholding, shows that the profit for the year ended October 31, 1936, after providing for depreciation and income tax, and including dividends from subsidiary companies, amounted to £184,451, compared with £178,309 for 1934-35. The dividend on the 6½ per cent. cumulative preference shares takes £49,968, leaving a balance of £134,483 (against £127,934), out of which the directors have allocated £4,193 to goodwill, £21,000 (against £20,609) to contingency reserve and £38,000 (against (£37,000) to general reserve. They recommend a dividend on the ordinary shares at the rate of 10 per cent. per annum, less tax (the same), which absorbs £65,456 (against £66,528), leaving a balance of £5,834. This balance, added to £63,878 brought in, the directors propose to carry forward. Further competitive businesses have been acquired by the S.M.T. group of companies during the year, the principal being Baillie Bros. Ltd., Dumbarton, and David Lawson Limited, Kirkintilloch.

Lincolnshire Road Car Co. Ltd.—Total revenue of this company, which is jointly controlled by the L.M.S. and L.N E. Railway Companies and Tilling & British Automobile Traction Limited, for the year ended September 30, 1936, was £244,766, against £211,419 for the previous year. After deducting expenses and depreciation, there is a balance of £21,095, which, added to £8,978 brought forward, makes a total of £30,073, against £30,853. From this total the directors propose to appropriate £5,000 (against £10,000) to general reserve, to pay a dividend of 10 per cent. for the year, amounting to £14,998 (against £11,875), and to carry forward £10,075. During the year 24,981 ordinary shares of £1 each were issued to the shareholders at par. Several local bus businesses have been acquired, as well as that of Fleetways Limited, operating an express service between Cleethorpes and London. Additional land has been acquired at Skegness for the purpose of building a bus station.

Interoceanic Railway of Mexico (Acapulco to Vera Cruz) Limited.—The report states that no settlement of the claims against the Mexican Government has been obtained. In the circumstances the directors are not in a position to present a revenue account for the year 1935. Gross earnings of the system for 1935 showed an increase of 620,000 pesos compared with the previous year. Operating expenses, however, increased by 1,910,000 pesos. The heavier operating expenses were mainly attributable, first, to the greatly increased cost of labour, and, secondly, to the abnormal cost of maintenance, &c., of rolling stock, consequent on the deteriorated condition in which the properties were returned in 1926, after 11½ years' seizure by the Mexican Government. According to the adjusted working returns received from the National Railways of Mexico, the operating managers of the Interoceanic System (which includes the lines of the two lessor companies—the Mexican Eastern Railway Co. Ltd. and the Mexican Southern Railway Limited), the loss for 1935, computed at the exchange rate of 10 pesos to the £, amounted to approximately £226,000 compared with £98,000 for the previous year. Exchange ruling at December 31, 1935, was about 18 pesos to the £. The balance at the debit of net revenue account in respect of the nine years to December 31, 1935, amounted to some £1,056,000, but complete adjustment of the operating accounts covering that period cannot be made until a settlement is reached with the Mexican Government in respect of the claims. The debenture stockholders' committee appointed under the schemes of arrangement has decided to extend conditionally the existing moratorium up to June 30, 1937.

Central Wagon Co. Ltd.—A final dividend is announced of 4½ per cent. on the £500,000 of share capital in respect of the year ended September 30. An interim dividend of 2½ per cent. was paid last May upon the then share capital of £400,000.

Turner & Newall Limited.—The directors announce that the net trading profits for the year to September 30 (after providing for depreciation, directors' fees, and income tax) amount to £1,163,308, the highest in the company's history. This figure compares with £780,625 for 1934-35. A final dividend of 13¾ per cent., less tax, is to be paid on January 23 on the issued ordinary stock (excluding the new ordinary shares recently issued), making 17½ per cent. for the year (against 12½ per cent.), and transfers are to be made of £10,000 to the staff pension fund (the same) and £200,000 to general reserve (against £100,000). The sum of £99,069 is to be carried forward, against £94,548 brought in.

Forthcoming Meetings

Dec. 14 (*Mon.*).—**Paraguay Central Railway Co. Ltd.** (Ordinary General), River Plate House, 12/13, South Place, E.C.2, at 11 a.m.

Dec. 14 (*Mon.*).—**United Railways of the Havana and Regla Warehouses Limited** (Ordinary General), Winchester House, Old Broad Street, E.C., at 12 noon.

Dec. 15 (*Tues.*).—**Scottish Motor Traction Co. Ltd.** (Annual General), North British Station Hotel, Edinburgh, at 12.30 p.m.

Dec. 16 (*Wed.*).—**Madras & Southern Mahratta Railway Co. Ltd.** (Ordinary General), 25, Buckingham Palace Road, Westminster, S.W.1, at 12 noon.

Dec. 17 (*Thurs.*).—**Pullman Car Co. Ltd.** (Ordinary General), Victoria Station, S.W.1, at 3 p.m.

ENGINEERING TRADESMEN: NEW RECRUITMENT SCHEME.—The War Office will issue on January 1, 1937, a new scheme for obtaining engineering tradesmen-recruits for the Army. The co-operation of the Director of Ordnance Factories, the railway companies, and many of the first-class engineering firms has been obtained. The Minister of Imperial Defence also concurs. The scheme is only for men between 21 and 25 years of age who have served an apprenticeship. A recruit can retain his membership of a trade union while in the Army, and if not a member he can join whilst serving. Full details will be given in the New Year.

NOTES AND NEWS

International Railway Congress Association.—The address of the International Railway Congress Association is now 231, Rue Royale, Brussels.

Floods in British Columbia.—Serious washaways caused a four-day cessation of traffic on the Canadian National Railways between Prince Rupert and Terrace, B.C., recently. One mixed train was worked out of Prince Rupert as far as Usk, but all westbound trains, including a through train from Montreal, were turned back at Smithers, B.C.

Bulk Handling of Grain, L.N.E.R.—For regular conveyance of barley between Hull and Burton, and Hull and Sleaford, the L.N.E.R. is introducing an additional fleet of 50 bulk grain vans. In these wagons the grain is poured in through openings in the roof, and self-discharged through steel hoppers underneath. Each wagon carries a load of 22½ tons of loose grain. The vehicles will be used in conjunction with the L.N.E.R. 40,000-ton train silo at the King George Dock, Hull.

Bouts-Tillotson "A" Licences Appeal.—The hearing of the appeal of the railway companies against the award by Mr. Gleeson Robinson (Licensing Authority for the Metropolitan Area) to Bouts-Tillotson Transport Limited of "A" licences for 128 vehicles and 42 trailers was begun before the Road Transport Appeal Tribunal on December 7. Mr. Rowand Harker, K.C., presided. Mr. Maxwell Fyfe, K.C., presented the case for the railway companies and continued his address on Tuesday and Wednesday. He submitted that the licensing authority had found that the railway facilities were adequate to deal with all except a small proportion of the traffic carried by Bouts-Tillotson. If the railway companies provided adequate transport facilities, it followed that a further grant to Bouts-Tillotson would cause wasteful competition, which was not in the public interest.

New L.M.S.R. Bridge Over the Clyde.—Rapid progress is being made with an important improvement scheme on the L.M.S.R. main West Coast Route to Scotland at Lamington (Lanarkshire), where a new viaduct is being built over the River Clyde to replace the existing one, and opportunity is being taken to ease the curvature so as to remove the former speed restriction of 40 m.p.h. The old viaduct, comprising four spans of bow-string lattice girders, is being replaced by steel plate girders with a concrete-covered, steel-beam floor supported partly by the masonry piers of the old bridge and partly by new mass concrete pier extensions. The new work contains 600 tons of steel and 3,700 tons of concrete and will cost about £26,500. The reconstruction is being carried out by the L.M.S.R. Chief Engineer's Department, the masonry contractors being Murdoch Mackenzie Limited, of Motherwell, and the steelwork contractors the Motherwell Bridge & Engineering Co. Ltd.

The Channel Tunnel.—Answering a question by Lord Kilmaine in the House of Lords on Wednesday as to whether the idea of a Channel Tunnel had been finally abandoned, the Earl of Erne said that the Government's attitude had not changed since the issue of the White Paper in June, 1930. In addition to the economic objections therein stated, it was felt that in an international crisis the existence of a tunnel would lead to a public demand for measures of defence, which would tend to concentrate an undue proportion of our defence resources in the region of the tunnel.

"A Journey in Scandinavia."—At the monthly meeting of the Railway Club held at the Royal Scottish Corporation Hall, Fetter Lane, E.C.4, on December 3, Mr. W. A. Willox (Vice-President) read a paper entitled "A Journey in Scandinavia." From Esbjerg in Denmark, Mr. Willox described his journey to Copenhagen, thence across the train-ferry to Malmö in Sweden and on to Stockholm. After visiting the north of Sweden, a return was made to Stockholm, and the journey continued to Oslo in Norway and Bergen. The lecturer noted the heavy engineering works, including many big bridges. Mr. Willox was also impressed by the cleanliness of Scandinavia, and by the time-keeping and good management of the railways. Travelling, including hotels, was everywhere very cheap.

New Coaches for L.N.E.R.—As part of the 1936-7 new rolling stock programme already recorded in our pages, the L.N.E.R. proposes to construct 652 coaches of various descriptions during 1937. Of these no fewer than 484 will be vestibuled corridor coaches for main line services. Only 84 non-vestibuled passenger coaches are to be constructed, and these are for use in suburban services in various parts of the country. The remaining vehicles to be constructed next year consists of 7 mail vans, 32 corridor brake vans for luggage and parcels service on main line trains, and 17 non-corridor vans for similar work on branch trains, 11 restaurant cars, 15 buffet cars, and 2 coaches of special design for service on the Aberdeen-Penzance service. The last two vehicles named will be so arranged as to combine the characteristics of restaurant and buffet car service. In these "travelling restaurants" passengers will be able to obtain at any time any sort of meal or refreshment they require, from tea and bread and butter to a grill, or from a boiled egg to an omelette with the requisite accompaniments. Among the specific services for which the new carriages are intended are the 9.0 a.m. Leeds to Glasgow express, the interval express service between Newcastle and Middlesbrough, the express trains between Leeds and West Hartlepool, Leeds and Bridlington, Hull and Scarborough. The new buffet cars will be placed in service on various trains, principally between Manchester and Cleethorpes, London and Cambridge, Newcastle and Middlesbrough, Leeds and Scarborough. The new restaurant cars will supplement existing services and replace cars of obsolete type to be broken up.

Agreed Charges.—Fifty more applications for the approval of agreed charges have been lodged with the Railway Rates Tribunal, as will be seen from the legal notice published on page 999. These applications may be inspected at the office of the tribunal, Bush House, Aldwych, London, W.C.2, at the Railway Clearing House, and at 11 important centres outside London. A copy of each application (1s. post free) may be obtained from Mr. G. Cole Deacon, Secretary, Rates and Charges Committee, 35, Parliament Street, S.W.1. Notice of objection must be filed with the Registrar of the Tribunal and a copy of each objection sent to Mr. Cole Deacon on or before January 5, 1937.

Sheffield Station and the Steel Industry.—A novel experiment in station name boards was unveiled at Sheffield, Victoria (L.N.E.R.), by the Lord Mayor of the city. The Lord Mayor was received by Sir Donald Matthews, a director of the company, and among the officers present were Mr. C. H. Newton and Mr. C. Dandridge. Designed to identify the station with the industry for which Sheffield is famous, it consists of the name "Sheffield" in stainless steel above the city coat of arms and the Sheffield Industries mark. The steel lettering for the station name and the slogan below, "World famed for steel, tools, cutlery, and silverware," was supplied by Firth-Vickers Limited, and Samuel Fox & Co. Ltd.; and the stainless-steel guard rails by Samuel Fox & Co. Ltd., and Samuel Osborn & Co. Ltd. Below the coat of arms are painted panels representing products of the following principal steel manufacturers:—

English Steel Corporation Limited; Turton Bros. & Matthews Limited; Thos. Firth & John Brown Limited; George Ibberson & Co.; Spear & Jackson Limited; Hadfields Limited; Easterbrook Allcard & Co. Ltd.; Samuel Fox & Co. Ltd.; Marsh Bros. & Co.; E. Howell & Co., Ltd.

Hatton-Bearley Doubling and Improvements, G.W.R.—The Great Western Railway announces that the single line from Hatton, near Warwick, to Bearley, near Stratford-on-Avon, is to be doubled. This section carries an increasing passenger and freight train traffic between the Midlands and South Wales, Bristol, and the West of England. The length of the doubling is about 4½ miles and the work involves the widening of five bridges over public

roads; the extension of one public level crossing; and the removal of some 27,600 cu. yd. of earthwork. The up platform at Bearley is to be extended to 440 ft., and the down to 550 ft. The intermediate station at Claverdon is to be rebuilt about 150 yd. nearer Bearley. At Claverdon, a new booking office is to be built at road level, and set back to provide a bay for standing vehicles. Accommodation is also to be provided for 24 bicycles adjacent to the building. Access to the platforms will be by pathways and ramped approaches of 1 in 10 gradient. Lighting at this station is to be by electricity in place of the present oil lamps.

Vapor Car-Heating System Demonstration.—As described on page 975, a party of mechanical engineers and technical representatives of the railway companies were the guests of Gresham & Craven Limited at a demonstration of the Vapor car-heating system, as applied to coaches now being built for the Chinese National Railways, held at the Smethwick works of the Birmingham Carriage & Wagon Co. Ltd., on December 3. The demonstration was preceded by an informal luncheon at the Queen's Hotel, Birmingham, which was presided over by Mr. S. T. Gresham, Director, Gresham & Craven Limited, who was supported by Mr. H. J. S. Moyses, Managing Director, Birmingham Carriage & Wagon Co. Ltd., and Mr. Hatherly, of Messrs. Sandberg, Consulting Engineers.

Road Accidents.—The Ministry of Transport return for the week ended December 5 of persons killed or injured in road accidents is as follows. The figures in brackets are those for the corresponding period of last year :—

	Killed, including deaths resulting from previous accidents	Injured
England ..	137 (113)	3,903 (3,705)
Wales	6 (1)	140 (146)
Scotland ..	14 (11)	375 (359)
	157 (125)	4,418 (4,210)

The total fatalities for the previous week were 125, compared with 146 for the corresponding period of last year.

British and Irish Traffic Returns

GREAT BRITAIN	Totals for 49th week			Totals to Date		
	1936	1935	Inc. or Dec.	1936	1935	Inc. or Dec.
	£	£	£	£	£	£
L.M.S.R. (6,916¼ mls.)						
Passenger-train traffic...	414,000	393,000	+ 21,000	24,236,000	23,616,000	+ 620,000
Merchandise, &c. ...	524,000	493,000	+ 31,000	23,555,000	22,268,000	+1,287,000
Coal and coke ...	299,000	302,000	− 3,000	11,821,000	11,465,000	+ 356,000
Goods-train traffic ...	823,000	795,000	+ 28,000	35,376,000	33,733,000	+1,643,000
Total receipts	1,237,000	1,188,000	+ 49,000	59,612,000	57,349,000	+2,263,000
L.N.E.R. (6,332 mls.)						
Passenger-train traffic...	275,000	267,000	+ 8,000	15,784,000	15,460,000	+ 324,000
Merchandise, &c. ...	360,000	330,000	+ 30,000	16,066,000	15,549,000	+ 517,000
Coal and coke ...	256,000	252,000	+ 4,000	11,415,000	11,025,000	+ 390,000
Goods-train traffic ...	616,000	582,000	+ 34,000	27,481,000	26,574,000	+ 907,000
Total receipts	891,000	849,000	+ 42,000	43,265,000	42,034,000	+1,231,000
G.W.R. (3,746½ mls.)						
Passenger-train traffic...	181,000	171,000	+ 10,000	10,232,000	10,015,000	+ 217,000
Merchandise, &c. ...	215,000	196,000	+ 19,000	9,410,000	9,018,000	+ 392,000
Coal and coke ...	118,000	122,000	− 4,000	4,947,000	4,929,000	+ 18,000
Goods-train traffic ...	333,000	318,000	+ 15,000	14,357,000	13,947,000	+ 410,000
Total receipts	514,000	489,000	+ 25,000	24,589,000	23,962,000	+ 627,000
S.R. (2,153 mls.)						
Passenger-train traffic...	252,000	244,000	+ 8,000	15,002,000	14,591,000	+ 311,000
Merchandise, &c. ...	59,500	50,000	+ 9,500	3,083,000	3,027,500	+ 55,500
Coal and coke ...	30,500	28,000	+ 2,500	1,507,000	1,476,500	+ 30,500
Goods-train traffic ...	90,000	78,000	+ 12,000	4,590,000	4,504,000	+ 86,000
Total receipts	342,000	322,000	+ 20,000	19,592,000	19,195,000	+ 397,000
Liverpool Overhead ... (6¼ mls.)	1,241	1,138	+ 103	58,567	57,669	+ 898
Mersey (4½ mls.) ...	4,716	4,365	+ 351	201,006	196,952	+ 4,054
*London Passenger Transport Board ...	570,400	544,800	+ 25,600	12,903,000	12,512,000	+ 391,000
IRELAND						
Belfast & C.D. pass. (80 mls.)	1,563	1,593	− 30	123,994	123,002	+ 992
,, ,, goods	609	607	+ 2	26,352	25,132	+ 1,220
,, ,, total	2,172	2,200	− 28	150,346	148,134	+ 2,212
†Great Northern pass. (543 mls.)	8,600	9,050	− 450	522,300	501,500	+ 20,800
,, ,, goods	9,650	9,100	+ 550	465,900	462,600	+ 3,300
,, ,, total	18,250	18,150	+ 100	988,200	964,100	+ 24,100
†Great Southern pass. (2,067 mls.)	31,029	30,500	+ 529	1,733,482	1,679,475	+ 54,007
,, ,, goods	63,569	59,407	+ 4,162	2,106,813	1,972,685	+ 134,128
,, ,, total	94,598	89,907	+ 4,691	3,840,295	3,652,160	+ 188,135

* 23rd week. † 48th week.

British and Irish Railways Stocks and Shares

Stocks	Highest 1935	Lowest 1935	Prices Dec. 9, 1936	Rise/Fall
G.W.R.				
Cons. Ord. ...	55½	44½	60½	−1
5% Con. Prefce ...	124	108	128½	—
5% Red.Pref.(1950)	117	106¾	110½	—
4% Deb.	118½	108	114½	−½
4½% Deb. ...	122	110	119½	—
4½% Deb. ...	129½	118	126½	−1
5% Deb.	140¼	130	137½	−1
2½% Deb. ...	82¼	68½	78½	—
5% Rt. Charge ...	137	128	135½	—
5% Cons. Guar. ...	136¾	120½	133½	—
L.M.S.R.				
Ord.	25516	16	31½	−½
4% Prefce. (1923)	58¼	43½	81	−1
4% Prefce. ...	87½	73½	91	−1
5% Red.Pref.(1955)	107	97¾	107*	—
4% Deb.	110¼	99½	107½*	−1
5% Red.Deb.(1952)	119 11/16	111 5/16	116½	—
4% Guar. ...	105⅝	95½	104½	−½
L.N.E.R.				
5% Pref. Ord. ...	15⅞	8¼	11¼	−¼
Def. Ord. ...	7 9/16	4¾	5½	−⅜
4% First Prefce.	74¾	48	77	−1½
4% Second Prefce.	31¾	16¼	28	−½
5% Red.Pref.(1955)	92¼	71	99	—
4% First Guar. ...	103 11/16	93	102	−½
4% Second Guar.	98¾	82½	97½	−1
3% Deb.	86	75	83*	−1
4% Deb.	109¼	98½	106½*	−½
5% Red.Deb.(1947)	118¼	106½	112½	—
4½% Sinking Fund Red. Deb.	112½	108	109*	—
SOUTHERN				
Pref. Ord. ...	87½	69¾	94	−1½
Def. Ord. ...	25 13/16	16¾	24½	−½
5% Prefce. ...	124	108¼	125	−½
5% Red.Pref.(1964)	117¾	109½	117½	—
5% Guar. Prefce.	136½	121½	133½	—
5% Red.Guar.Pref. (1957)	121¼	112½	117½	—
4% Deb.	116¾	107	112*	—
5% Deb.	138	130¼	135½*	−1
4% Red. Deb. 1962–67	115	106½	112*	+½
BELFAST & C.D.				
Ord.	9	4	5⅛	—
FORTH BRIDGE				
4% Deb.	111¼	104¼	105½	—
4% Guar. ...	109⅞	104	105½	—
G. NORTHERN (IRELAND)				
Ord.	20	7	12	—
G. SOUTHERN (IRELAND)				
Ord.	57½	14½	58½	−1½
Prefce.	50	25¼	65	—
Guar.	88¾	51¼	93	−4¼
Deb.	86¼	70	96½	−3
L.P.T.B.				
4½% "A" ...	130	119¾	124½*	−½
5% "A" ...	139¾	130	135½*	—
4½% "T.F.A." ...	113¾	108	109*	—
5% "B" ...	131½	122¾	125½*	−1½
"C"	109½	91	95	−1
MERSEY				
Ord.	23⅛	9¼	37½	−1
4% Perp. Deb. ...	100½	93½	101	—
3% Perp. Deb. ...	75½	67	76½	—
3% Perp. Prefce.	62	47¼	67½	—

* ex dividend

CONTRACTS AND TENDERS

A summary of the L.N.E.R. new coaching stock programme for 1937 (part of the 1936-7 arrangements recorded in detail in our issue of January 3, 1936) is given in our News section this week.

L.N.E.R. Power Signalling Contract

The Siemens & General Electric Railway Signal Co. Ltd. has received a contract from the L.N.E.R. for a complete power-signalling installation at Edinburgh, Waverley East. This follows on the successful introduction of power signalling at Waverley West, which contract was also carried out by the Siemens & General Electric Railway Signal Co. Ltd., and formed the subject of an illustrated article in the November 27, 1936, issue of THE RAILWAY GAZETTE. The new contract includes the supply and installation of an all-electric interlocking frame of 207 levers, with two illuminated diagrams; 71 a.c. condenser fed track circuits; 90 point machines; 52 colour light signals; 87 banner type shunt signals; and 7 S.G.E. blind type route indicators. There will be approximately 300 a.c. relays of all types.

J. Baker & Bessemer Limited has received an order from the Central Argentine Railway for 170 carriage and wagon tyres.

Alfred Herbert (India) Limited has received orders from the Indian Stores Department for one oil-fired Babbitt melting furnace with extra fan; one grinding machine; and three type NC3 and one type NC4 pneumatic clipping hammers.

D. Wickham & Co. Ltd. has received an order from the Peruvian Corporation for a diesel power bogie, which will be equipped with a Saurer diesel engine, Buchi supercharger, Vulcan Sinclair hydraulic coupling, and either an electrically or a mechanically operated gear box.

D. Wickham & Co. Ltd. has also received orders from the Entre Rios and Argentine North Eastern Railways, each for one petrol-engined gang trolley.

Haine St. Pierre Forges-Usines & Fonderies, S.A., has received an order from the Egyptian State Railways Administration for locomotive wheels and axles at a total price of £718, delivery f.o.b. Antwerp. (Ref. E.S.R. 21,540.)

Standard Telephones & Cables Limited has received an order from the Egyptian State Railways Administration for an automatic telephone exchange at a total price of £1,239, delivery f.o.b. London. (Ref. E.S.R. 34,635.)

C. H. Johnson & Sons Ltd. has received orders for a total of 14 portable coal elevators for coaling locomotives in running sheds. Ten of these elevators are required for the Buenos Ayres Great Southern Railway and four for the Buenos Ayres Western Railway.

John I. Thornycroft & Co. Ltd. has received a further repeat order from the Great Western Railway for 10 Trusty class four-cylinder petrol-engined chassis, five of which will be equipped with draw-bar gear and trailer brake gear for towing a six-ton trailer, thus giving a total payload for vehicle and trailer of 12 tons. The chassis is of type PE/AC4 incorporating the latest Thornycroft four-cylinder overhead valve petrol engine, developing a maximum power of 74 h.p. at 2,200 r.p.m. In the case of the five chassis designed for trailer haulage an auxiliary gearbox is to be provided giving an additional four forward speeds as well as a reverse speed. The short wheelbase of 12 ft. 8 in. arising from the setting back of the front axle, results in a small turning circle and gives also good accessibility to the engine unit.

Railcars for South America

Further to the announcement in this column last week that the Drewry Car Co. Ltd. had received an order from the Buenos Ayres Great Southern and Buenos Ayres Western Railways for a total of 99 railcars, we are now enabled to supplement that information with the following particulars. The coaches are to be manufactured throughout in the Dick Kerr works of the English Electric Co. Ltd., with which the Drewry Car Co. Ltd. is closely associated. The order comprises four different body arrangements, but the underframes, power bogies, and trailing bogies are to be interchangeable throughout. The units are of the Drewry standard power bogie design and will be equipped with 102-h.p. 6 LW Gardner diesel engines, and will be fitted with hydraulic couplings in conjunction with Wilson-Drewry four-speed epicyclic transmission and all-gear drive by means of spiral bevels and helical pinion and spur wheel. The transmission units will be mounted in the Drewry patent three-point independent subframe arrangement. The average fully laden weight will be approximately 21 tons and the vehicles will be capable of a maximum speed of 50 m.p.h. on straight level track. The auxiliary equipment will include J. Stone & Company's engine-driven 24-volt generators, together with lead acid batteries for coach lighting and electric starting equipment; the actual starter motors will be of C.A.V.-Bosch manufacture. Westinghouse vacuum brake equipment is to be included and coach heating will be by means of exhaust waste heat boilers and hot water elements in the passenger compartments. All the railcars are to be fitted with British Timken axleboxes. The work will be carried out under the supervision and inspection of Messrs. Livesey & Henderson, consulting engineers to the Buenos Ayres Great Southern and Buenos Ayres Western Railways. This is believed to be the largest single order for diesel railcars yet placed.

The Baldwin Locomotive Works has received an order for 15 locomotives from the Denver Rio Grande Railroad and an additional five from the Seaboard Air Line Railway, states Reuters. The Seaboard Air Line at the same time ordered 1,000 box cars from Pullman Inc.

Burn & Company has received an order from the Government of India, Railway Department (Railway Board), for 17 Class TP petrol-tank wagons required for the Eastern Bengal Railway.

Tenders are invited by the West of India Portuguese Guaranteed Railway, receivable at 4, Coleman Street, London, E.C.2, by January 1, 1937, for the supply of five three-ton electric level luffing wharf cranes. Copies of drawings may be obtained at the office of the company's consulting engineers, Messrs. Robert White & Partners, 3, Victoria Street, Westminster, S.W.1.

The directors of the Great Western Railway Company have authorised placing contracts for the following:—

John I. Thornycroft & Co. Ltd., road motors. (See previous column.)

Tasker of Andover (1932) Limited, and Cranes (Dereham) Limited, 112 six-ton road motor trailer chassis.

Scammell Lorries Limited, 112 sets of trailer coupling gear.

East Ferry Road Engineering Works Co. Ltd., one three-ton movable hydraulic crane and grab to be erected at the Great Western docks at Brentford.

E. A. Foulds Limited, supply and erection of a one-ton electric hoist at the coal stage, Old Oak Common.

Frigidaire Limited, supply and installation of six sets of electrical refrigerating plant in kitchen cars now under construction.

For the Swindon Works

Craven Bros. (Manchester) Limited, supply of a carriage wheel turning lathe.

A.I. Electric Welding Appliances Company, supply of an automatic tube welding machine.

Heavy Buying of Railway Equipment in America

A sharp spurt in buying of rolling stock, rails, and other equipment by American railroads is reported by Reuters Trade Service from New York. The New York Central system has awarded orders for 50 Hudson-type passenger locomotives and 50 eight-wheeled shunting locomotives, to be delivered early next year; the cost is reckoned at about $8,600,000. The railway has also bought 82,150 tons of steel rails, and track accessories with a value of about $5,500,000. Before the new first-quarter rail prices became effective on December 1, it was estimated that orders for as much as half a million tons of rails were about to be placed. Other new equipment orders pending were for 2,000 large freight cars for the Bessemer & Lake Erie. The Chicago & North-Western was inquiring for 500 freight cars, the Gulf, Mobile & Northern for 400, the Chesapeake & Ohio for 2,125, and the Duluth, Missabe

& Northern for 250 to 1,000 ore cars. There were also inquiries for about 250 underground railway passenger cars from New York City. Locomotive inquiries pending included 10 for the Western Maryland, and five for the Delaware, Lackawanna & Western Railroad; the Chicago, Burlington & Quincy announced that it would build 11 at its own shops. Thirty-one were definitely ordered by the Chicago, Milwaukee, St. Paul & Pacific RR. The Rock Island RR. ordered 350 freight cars and three new streamlined trains, and a Philadelphia manufacturer placed an order for 200 tons of stainless steel to be used in six new streamlined trains ordered by the Chicago, Rock Island & Pacific.

R. Wright & Partners Limited has received orders from the Indian Stores Department for a total of 342 tyres.

The Egyptian State Railways Administration has placed orders with Maris Export Co. Ltd. for 9,000 metric tons and with Beynons Limited for 153,000 tons of sized coal.

The Associated Equipment Co. Ltd. has received orders from the Maidstone & District Motor Services Limited for eight oil-engined Regal and 14 oil-engined Regent passenger vehicles.

Beyer, Peacock & Co. Ltd. has received an order from the Leopoldina Railway for one oil-burning equipment, required for the conversion of a coal-burning locomotive to oil-fuel operation.

The Witkowitzer Ironworks has received an order from the Chekiang-Kiangsi Railway, states the Prague correspondent of *The Financial Times*, for the supply of 2,900 wagons and a quantity of rails and other material for delivery in March and April, 1937. The invoice value of the order is stated to be 42,000,000 Czech crowns, or £330,000.

The Economical Boiler Washing Co. Ltd. has received an order through George Spencer Moulton & Co. (India) Ltd. from the East Indian Railway for the supply of one patent hot-water boiler washing plant of the double tank vertical type, to be capable of dealing with nine engines at the same time, three blowing off, three washing out, and three filling.

The Cargo Fleet Iron Co. Ltd. has received an order from the Bikaner State Railways Administration for 131 tons of medium manganese rails, to be supplied to the inspection of Messrs. Rendel, Palmer & Tritton.

Aldhous Successors Limited has received an order from the Kenya & Uganda Railways Administration, to the inspection of Messrs. Rendel, Palmer & Tritton, for one twin-screw motor tug required for lake service. The vessel will have the following dimensions: length 80 ft., beam 16 ft., depth 5 ft. 9 in., and draught 3 ft. 4 in. The propelling machinery is to be two five-cylinder No. 5J7 Gardner marine diesel engines, developing 150 b.h.p. at 340 r.p.m. The engines are to be of the two-stroke direct-injection cold-starting direct reversing type.

The British Standards Institution has recently issued a specification (B.S.S. 709—1936) outlining standard methods of making a bend test on welded joints.

The Italo-French Transport Company, states a Reuters message from Djibouti, has been formed to handle the increased goods traffic arriving at Djibouti. The new company will gradually order new rolling stock and engage new personnel, the message adds.

The Chicago, Milwaukee, St. Paul & Pacific Railroad has ordered 82,000 tons of steel rails from the Inland Steel Company and the United States Steel Corporation, states Reuters. The Erie Railroad is also reported to have ordered 21,333 tons of steel rails from the United States Steel Corporation, the Bethlehem Steel Corporation, and the Inland Steel Company.

Anglo-Argentine Trade Agreement

Signed on December 1 and entered into with retrospective effect from November 20, 1936, the new Anglo-Argentine Trade Agreement provides the following preferences for British railway materials entering Argentina :—

Locomotives and spare locomotive parts. Valuation, declared value. Duty, five per cent. on valuation. (Tariff No. 26.)

Rails of steel or iron, sleepers of iron and fishplates for railways or tramways (steam, animal or electric power), also plant for the installation and traction of electric tramways, comprising as plant, only motors for coaches, coach undergear, cables, trolleys, wire, coils, fuse boxes, brakes, tyres, lightning conductors, springs, insulating media, controllers, wheels, " rosettas," crossings and switches. Valuation, declared value, provided that these articles are not comprised in other tariff numbers. Duty, five per cent. on valuation. When intended for use in towns of fewer than 100,000 inhabitants and complying with the requirements of Article 4 of Law No. 11,281, duty free. (Tariff No. 13.)

The 10 per cent. surcharge is not included in the rates of duty set out in the schedule of the above Tariffs.

Shaw Wallace & Company has received orders from the Indian Stores Department for a total of 53 straight axles.

Ingersoll Rand (India) Limited has received an order from the Indian Stores Department for one electrically-driven air compressor.

Heatly & Gresham Limited has received an order from the Indian Stores Department for one 8-in. stroke slotting machine with spares and one 10-in. stroke puncher slotting machine with spares.

The Atchison, Topeka & Santa Fe Railway has ordered 27 locomotives, 3,025 freight cars, and 155,000 tons of steel rails and fastenings at a total cost of $20,304,000, states Reuters. The order for the locomotives has been awarded to the Baldwin Locomotive Works.

Hurst Nelson & Co. Ltd. has received an order from W. McElroy & Co. Ltd. for 130 12-ton coal wagons.

Taylor Brothers & Co. Ltd. has received orders from the Central Argentine Railway for 75 axles and 170 tyres for carriages and wagons.

U.S.S.R. Orders Placed in Great Britain

According to the preliminary figures supplied by the U.S.S.R. trading organisations, the total value of orders placed and purchases made in Great Britain in October of this year amounted to £1,114,560, as compared with £891,316 in October, 1935. In the first 10 months of this year the Soviet orders and purchases aggregated £8,799,505, as compared with £8,653,844 in the January-October period of last year.

In the Overseas Railway Affairs section of our December 4 issue the intention of the Danish State Railways to fit all its goods stock with, and to convert all its locomotives and passenger rolling stock from vacuum to air brake was recorded. A Reuters message now states that, after trials with different systems, the choice has fallen on the Hildebrand Knorr brakes recently put on the market by the Knorr Bremse A.G. of Berlin, maker of the Kunze-Knorr brake, which is standard in Sweden and Germany, Denmark's nearest neighbours. The estimated cost of carrying out the change is 10 to 12 million kroner (roughly £446,450 to £535,750) at the present rate of exchange) half being for the brakes themselves and half for the cost of installing them. In the first place 600 engines, 2,000 passenger coaches and 2,000 goods wagons will be equipped with the new compressed air brakes.

Tenders are invited by the Egyptian State Railways Administration, receivable by the Superintendent of Stores, Saptieh, Cairo, by January 2, 1937, for the supply of 4,750 globes required for Tilley lamps.

Tenders are invited by the Gaekwar's Baroda State Railways, receivable by Messrs. Rendel, Palmer & Tritton, 55, Broadway, Westminster, S.W.1, by December 30, for the supply of two metre-gauge YK type 2-6-0 locomotives.

The Chief Controller of Stores, Indian Stores Department (Electrical Section), New Delhi, invites tenders, receivable by January 16, 1937, for the supply on an annual rate contract basis of cast iron pipes for the year commencing April 1, 1937.

The New South Wales Department of Railways is calling for tenders, receivable in Sydney by February 17, 1937, for the supply of two water-tube boilers complete with accessories; mechanical stokers and spare parts. Firms desirous of offering equipment of United Kingdom manufacture can obtain further details from the Department of Overseas Trade.

LEGAL AND OFFICIAL NOTICES

In the Court of the Railway Rates Tribunal.

Road and Rail Traffic Act, 1933

Agreed Charges

NOTICE IS HEREBY GIVEN that Applications for the approval of Agreed Charges under the provisions of Section 37 of the Road and Rail Traffic Act, 1933, short particulars of which are set out in the Schedule hereto, have been lodged with the Railway Rates Tribunal.

The Procedure to be followed in regard to the inspection of the said Applications and the filing of Notices of Objections is that published in the "London Gazette" of 28th July, 1936.

Printed copies of the Procedure can be obtained from the Office of the Tribunal, Bush House, Aldwych, London, W.C.2.

Notices of Objection to any of the said Applications must be filed on or before the 5th day of January, 1937.

A copy of each Application can be obtained from Mr. G. Cole Deacon, Secretary, Rates and Charges Committee, 35, Parliament Street, Westminster, London, S.W.1, price 1s. post free.

T. J. D. ATKINSON,
Registrar.

8th December, 1936.

Number of Application	Name of Trader and General Description of Traffic
1936—No. 542	THOS. FORMAN & SONS LTD., Nottingham; Calendars.
1936—No. 543	THE "SHIELD" XMAS PARCEL COMPANY, St. Andrews Works, Woodhead Road, Bradford; Confectionery, Toys and Fancy Goods.
1936—No. 544	CLIFFORD SALES ORGANISATION, 59–60, Gracechurch Street, London, E.C.3; Carpet Sweepers.
1936—No. 545	THE CROWN BEDDING CO. LTD., Redfern Road, Tyseley, Birmingham; Bedsteads, Divans, Mattresses, Bedding, Pillows and Articles used in the manufacture thereof, Cardboard Boxes, &c. *(Applicable also to traffic consigned by one Associated or Subsidiary Company).*
1936—No. 546	FOSTER CLARK LIMITED, Maidstone; Confectionery, Groceries, Preserves and Provisions.
1936—No. 547	THE GENERAL UTILITY CO. LTD., 209–211, Crossloan Road, Govan, Glasgow, S.W.1; Ice Cream Freezing Machines and Accessories, Potato Cutting and Peeling Machines, Ice Cream Cans.
1936—No. 548	HARDEN BROS. & LINDSAY LIMITED, 30–34, Mincing Lane, London, E.C.3; Tea, Coffee, Cocoa, &c.
1936—No. 549	KAYS (SPORTS & GAMES) LIMITED, Carlisle Road, The Hyde, London, N.W.9; Toys, Indoor Games, &c.
1936—No. 550	MANBRE & GARTON LIMITED, Winslow Road, Hammersmith, London, W.6; Brewers' Sugar, &c.; Glucose, Saccharum, Flaked Maize.
1936—No. 551	MAYNARDS LIMITED, Vale Road, Finsbury Park, London, N.4; Confectionery, Bon-bons, Fancy Goods, &c.
1936—No. 552	M. OLDROYD & SONS LTD., Spinkwell Mills, Dewsbury; Cloth.
1936—No. 553	PERGA LIMITED, 9/10, Bond Court, Walbrook, London, E.C.4; Waxed Paper Cartons, Tin Strips, Machinery, Coarse Paper, &c. *(Applicable to traffic consigned by one Associated or Subsidiary Company).*
1936—No. 554	RICHARD & CO. LTD., 10–18, Goswell Road, London, E.C.1; Clocks, &c.
1936—No. 555	ROMAC MOTOR ACCESSORIES LIMITED, Romac Works, The Hyde, Hendon, London, N.W.9; Motor Accessories, Crude Glycerine, Lubricating Oil, Nitro-cellulose Lacquer, &c.
1936—No. 556	EDWARD WEBB & SONS (STOURBRIDGE) LTD., Wordsley, Stourbridge, Worcs; Seeds, Packed Manure, &c.
1936—No. 557	BRITISH HORTICULTURAL CO. LTD., Walton, Peterborough; Bulbs, Plants, Seeds, &c. *(Applicable also to traffic consigned by two Associated or Subsidiary Companies).*
1936—No. 558	THE BRITON BRUSH CO. LTD., Wymondham, Norfolk; Brushes, Feather Dusters, &c., and Broom and Brush Heads and Blocks.
1936—No. 559	ENERGEN FOODS CO. LTD., Bridge Road, Willesden, London, N.W.10; Grocery Articles, Bread, &c.
1936—No. 560	EVESON BROS. (1928) LTD., Monarch Works, Lye; Hollow-ware, Electric Wash Boilers, Fires, Toasters, and Kettles.
1936—No. 561	FAIRE BROS. & CO. LTD., Rutland Street, Leicester; Drapery Articles, Box Counters and Stiffeners, Cardboard, Leatherboard, &c.
1936—No. 562	GERARD BROS. LTD., The Soap Works, Wilkinson Street, Nottingham; Soap, Bath Salts, Glycerine, Perfumery, Toilet Preparations, &c.
1936—No. 563	THE GRE-SOLVENT COMPANY, Junction Works, Whitehall Road, Leeds; Soap, Cleansing Powder and Paste, Polishes, Enamels, Metallic Cement and Flux.
1936—No. 564	JAMES GRISDALE & SONS, Station Road, Otley, Yorks; Candles, Tapers, and Soap. *(Applicable also to traffic consigned by Nine Associated or Subsidiary Companies).*
1936—No. 565	ARTHUR HARRISON & CO. LTD., Globe Mills, Victoria Road, Leeds; Cloth.
1936—No. 566	THE IMPERIAL TOBACCO COMPANY (OF GREAT BRITAIN AND IRELAND) LIMITED, East Street, Bedminster, Bristol; Manufactured Tobacco, etc.
1936—No. 567	J. LYONS & CO., LTD., Cadby Hall, Kensington, London, W.4; Biscuits, Chocolate, Coffee, Cocoa, Confectionery, Tea, Fancy Goods, &c.
1936—No. 568	JOHN NOBLE LIMITED, Brook Street, Manchester, 1; Clothing, Drapery and General Stores Wares. *(Applicable also to traffic consigned by two Associated or Subsidiary Companies.)*
1936—No. 569	NORTH BRITISH RAYON LIMITED, Clifford's Inn, London, E.C.4; Artificial Silk Yarn.
1936—No. 570	S. NOTON, LTD., Endurance Works, Blackhorse Lane, Walthamstow, E.17; Fibreboard Cases or Bags, Handbags or Holdalls.
1936—No. 571	WEBER LIMITED, 29, Cowcross Street, London, E.C.1; Bacon, Hams, Preserves, Provisions, &c.
1936—No. 572	BROCK-WALLACE LIMITED, Silver Royd Mills, Wortley, Leeds, 12; Dyed and Cleaned Goods.
1936—No. 573	HELLIWELL & SUTCLIFFE, Hollins Works, Mytholmroyd, Yorks; Clothing.
1936—No. 574	M. JACKSON & SONS (CLOTHIERS) LTD., 94, Clayton Street, Newcastle-on-Tyne; Cloth, Clothing, Shoes, &c.
1936—No. 575	LEAR, BROWNE & DUNSFORD, Exeter; Clothing, Drapery, &c.
1936—No. 576	THE PILE FABRIC MANUFACTURING CO. (BRADFORD) LTD., Industry Works, Bradford, Yorks; Furnishing Fabrics.
1936—No. 577	R. SUTCLIFFE & CO., Melbourne Works, Hebden Bridge; Clothing.
1936—No. 578	C. F. TAYLOR & CO. LTD., Shipley; Knitting Wool.
1936—No. 579	W. A. TURNER, "The Garden Factory," Stowmarket; Lard, Liver, Meat (Preserved), Pork, Pork Pies and Sausages, &c.
1936—No. 580	THE DUCHESS OF DEVONSHIRE DAIRY CO. LTD., Tiverton, Devon; Butter, Cooked Meats, Cream, Eggs, Fish and Meat Pastes, Sausages, &c.
1936—No. 581	THE FORE STREET WAREHOUSE CO. LTD., 104, Fore Street, London, E.C.2; Drapery, Underwear and Millinery.
1936—No. 582	HIGHAM CAINE & CO. LTD. (HIGHCO STORES), 17, Chorlton Street, Manchester; Clothing, Drapery and General Stores Wares. *(Applicable also to traffic consigned by one Associated or Subsidiary Company.)*
1936—No. 583	THE SHIELDS ICE & COLD STORAGE CO. LTD., North Shields; Preserved Food and Fruits, Cordials, &c.
1936—No. 584	THE VICTORIA CREAMERY CO. LTD., Airdrie; Bakers' Filling Cream, Confectionery and Spice.
1936—No. 585	SWEARS & WELLS LIMITED, Britannia House, 16–17, Old Bailey, London, E.C.4; Furniture Carpets, Clothing, Drapery and General Stores Wares, &c. *(Applicable also to traffic consigned by five Associated or Subsidiary Companies.)*
1936—No. 586	THE WESSEX GLOVE CO. LTD., Yeovil, Somerset; Gloves.
1936—No. 587	BRAND & CO. LTD., Mayfair Works, Vauxhall, London, S.W.8; Groceries, Preserves, Provisions, &c.
1936—No. 588	THE CARRONGROVE PAPER CO. LTD., Carrongrove Paper Mills Denny, Stirlingshire; Paper.
1936—No. 589	BOOTH'S DISTILLERIES LIMITED, 83, 84 and 85, Turnmill Street, London, E.C.1; Wines, Spirits, &c.
1936—No. 590	JEFFREYS, MILLER & CO. LTD., Leyland Mills, Wigan; Extract of Malt, Malt Extract and Cod Liver Oil.
1936—No. 591	W. T. TAYLOR & CO. LTD., Victoria Mills, Horwich, Nr. Bolton, Lancs; Towels.

WANTED. Experienced Railway Rolling Stock Draughtsman. Must be thoroughly conversant with R.C.H. regulations. Apply stating age, previous experience, and salary required to MANAGING DIRECTOR, CHARLES ROBERTS & Co., LTD., Horbury Junction, near Wakefield.

WANTED.—"Railway Gazettes," July-December, 1905; January-June, 1906; January-June, 1912; July-December, 1907; July-December, 1912; January-June, 1917.—W. CONSTANTINE, 111, Grosvenor Road, S.W.1.

LOCOMOTIVE Engineer, aged 55, at present employed as Loco. and C. and W. Supt. of an Indian Railway, retiring from service in India in March, 1937, desires employment in England. Has had experience in all matters concerning the mechanical dept. of a railway, including maintenance and operation of diesel electric locomotives.—Write "W.A.," c/o STREETS, 6, Gracechurch Street, E.C.3.

L.M.S.R. DIVISIONAL OPERATING SUPERINTENDENT'S DINNER.—The thirteenth annual dinner of the Divisional Superintendent of Operation, Western Division L.M.S.R., was held in the Crewe Arms Hotel, Crewe, on December 4.

After the loyal toast had been given with musical honours, the toast of the L.M.S.R. was proposed by Mr. J. S. Elliott, Motive Power Section; Mr. C. R. Byrom, Chief Operating Manager, responded. Mr. W. A. Heydon, Chief Trains Clerk, proposed the toast of "The Visitors," to which Mr. H. E. Morgan, Signal and Telegraph Engineer, responded, supported by Messrs. S. H. Fisher, Assistant to Chief Operating Manager, and F. A. Lemon, Locomotive Works Superintendent. The toast of "The Chairman" was proposed by Mr. M. N. Waugh, and Mr. S. E. Parkhouse responded. A smoking concert followed.

NEW BUGATTI SERVICE.—The P. L. M. Railway has transferred more of its 400 b.h.p. Bugatti express railcars to the Lyons depot, and they are now operating fast services thence to Geneva (two trips a day), and to Strasbourg (one trip a day) over the P.L.M. and Alsace-Lorraine lines.

XUM

PARLIAMENTARY NOTICES

IN PARLIAMENT.
SESSION 1936-37.

London Midland & Scottish Railway

NOTICE IS HEREBY GIVEN that application has been made to Parliament in the present Session by the London Midland & Scottish Railway Company (hereinafter referred to as "the Company") for leave to bring in a Bill under the above short title intituled "A Bill to empower the London Midland & Scottish Railway Company to construct works and to acquire lands; to modify rates, dues and charges at Holyhead Harbour; and for other purposes."

A Notice containing a concise summary of the purposes of the Bill has been or will be published in full in *The Times* newspaper on the 4th and 11th days of December, 1936.

And Notice is hereby further given that on or before the 20th day of November, 1936, plans and sections relating to the said works and plans of all lands which may be taken or used compulsorily under the powers of the Bill and a book of reference to such plans were deposited for public inspection as follows (that is to say):—As regards the works and lands in the County of Lancaster with the Clerk of the County Council at his office at Preston; as regards the works and lands in the West Riding of the County of York with the Clerk of the County Council at his office at Wakefield; as regards the lands in the County of Chester with the Clerk of the County Council at his office at Chester; as regards the lands in the County of the Soke of Peterborough with the Clerk of the County Council at his office at Peterborough; as regards the lands in the County of Stafford with the Clerk of the County Council at his office at Stafford; as regards the lands in the County of Warwick with the Clerk of the County Council at his office at Warwick; as regards the lands in the County of Derby with the Clerk of the County Council at his office at Derby; as regards the lands in the City and County Borough of Birmingham with the Town Clerk at his office at Birmingham; as regards the lands in the City and County Borough of Coventry with the Town Clerk at his office at Coventry; as regards the lands in the County Borough of Burton-upon-Trent with the Town Clerk at his office at Burton-upon-Trent; and as regards the lands in the County Borough of Wallasey with the Town Clerk at his office at Wallasey. And that copies of so much of the said plans, sections and book of reference as relates to each of the several areas hereinafter mentioned in which the works and lands are situate were on or before the said 20th day of November, 1936, deposited for public inspection as follows (that is to say):—As relates to any non-county borough with the Town Clerk of such borough at his office; as relates to any urban district (not being a borough) or to any rural district with the Clerk of the district council of such district at his office; as relates to any parish having a parish council with the Clerk of such parish council at his office, or (if he has no office) at his residence; and as relates to any parish not having a parish council with the Chairman of the parish meeting of such parish at his residence.

On and after the 4th day of December, 1936, a copy of the Bill may be inspected and copies thereof obtained at a price not exceeding five shillings each at the offices of Mr. W. O. Hickson, Divisional Solicitor, Hunts Bank, Manchester, and Messrs. Beale & Co., 12, Newhall Street, Birmingham; at the Stationmaster's office at the following railway stations of the Company, viz.:—Chesterfield, Parkgate and Rawmarsh, Wallasey, Peterborough, Burton-upon-Trent, Elstree, Harrow, Laindon and Holyhead, and also at the offices of the undermentioned Chief Legal Adviser and Parliamentary Agents.

Dated this 30th day of November, 1936.

H. L. THORNHILL,
1, The Abbey Garden,
Westminster, S.W.1.
Chief Legal Adviser.

BEALE & CO.,
22, Great Smith Street,
Westminster, S.W.1.
Parliamentary Agents.

SCOTTISH OFFICE.

NOVEMBER, 1936.

PRIVATE LEGISLATION PROCEDURE (SCOTLAND) ACT, 1936.

London Midland & Scottish Railway

NOTICE IS HEREBY GIVEN that application has been made in the month of November, 1936, to the Secretary of State by the London Midland & Scottish Railway Company (hereinafter referred to as "the Company") for a Provisional Order (hereinafter referred to as "the Order") under the Private Legislation Procedure (Scotland) Act, 1936, under the above short title and intituled "(Draft) Provisional Order to extend the time for the completion of certain authorised Railways and Works by the London Midland & Scottish Railway Company and for other purposes."

The names and dates of publication of the newspapers in which the full Notice for the Order has been or will be published are as follows:—

The Times, London, of 4th and 11th December, 1936.
The Glasgow Herald of 2nd and 9th December, 1936.

On and after the 4th day of December, 1936, a copy of the Order may be inspected and copies thereof obtained at a price of 1s. per copy at the Stationmaster's Office at the following railway stations of the Company, viz.:—Greenock Central and Beattock, and also at the offices of the undersigned Solicitors and Parliamentary Agents.

Dated this 30th day of November, 1936.

JAMES WILSON,
302, Buchanan Street,
Glasgow.
Solicitor (Scotland).

H. L. THORNHILL,
1, The Abbey Garden,
Westminster, S.W.1.
Chief Legal Adviser.

BEALE & CO.,
22, Great Smith Street,
Westminster, S.W.1.
Parliamentary Agents.

IN PARLIAMENT.
SESSION 1936-37.

London & North Eastern Railway

NOTICE IS HEREBY GIVEN that application has been made to Parliament in the present Session by the London and North Eastern Railway Company for an Act under the above name or short title intituled "A Bill to empower the London and North Eastern Railway Company to construct a railway and other works and to acquire lands; to make provision with respect to the Nottingham Canal of the said Company; and for other purposes."

A notice containing a concise summary of the purposes of the intended Act has been or will be published in *The Times* newspaper of the 4th and 11th December 1936.

On and after the 4th day of December 1936, a copy of the Bill may be inspected and copies thereof obtained at a price not exceeding four shillings for each copy at the undermentioned offices and at the Stationmaster's office at the following railway stations of the Company, viz., Chelmsford, Hertford East and Tottenham.

And notice is hereby also given that on or before the 20th day of November 1936 plans and sections relating to the said intended works and plans of all lands which may be taken or used compulsorily with a book of reference to such plans were deposited for public inspection as follows (that is to say):—

"As regards works and lands in the County of Essex with the Clerk of the County Council of that County at his office at Chelmsford; as regards works and lands in the County of Hertford with the Clerk of the County Council of that County at his office at Hertford; as regards works and lands in the County Borough of West Ham with the Town Clerk of that Borough at his office at West Ham; as regards works and lands in the County Borough of East Ham with the Town Clerk of that Borough at his office at East Ham; and as regards lands in the County of Middlesex with the Clerk of the County Council of that County at his office at The Guildhall, Westminster, S.W.1."

And that copies of so much of the said plans sections and books of reference as relates to each of the several areas hereinafter mentioned in or through which the said intended works are proposed to be made or lands are situate were on or before the said 20th day of November deposited for public inspection as follows (that is to say):—

"As relates to any non-county borough with the Town Clerk of such borough at his office; as relates to any urban district (not being a borough) or to any rural district with the Clerk of the district council of such district at his office; and as relates to any parish having a parish council with the Clerk of the parish council of such parish at his office, or, if he have no office, at his residence."

Dated this 7th day of December, 1936.

I. BUCHANAN PRITCHARD,
King's Cross Station,
London, N.1.
Chief Legal Adviser.
H. R. CRIPPS,
4, Cowley Street,
Westminster, S.W.1.
Chief Assistant Solicitor.
SHERWOOD & CO.,
Clarence House,
4, Central Buildings,
Westminster, S.W.1.
Parliamentary Agents.

Parliamentary Notices—*(continued)*

IN PARLIAMENT.
SESSION 1936-37.

Southern Railway

NOTICE IS HEREBY GIVEN that application has been made to Parliament in the present Session by the Southern Railway Company for an Act under the above name or short title intituled "A Bill to empower the Southern Railway Company to construct a Railway and other Works and to acquire lands; to extend the time for the completion of certain works and the compulsory purchase of certain Lands; and for other purposes."

A Notice containing a concise summary of the purposes of the intended Act has been or will be published in *The Times* newspaper of the 1st and 8th December, 1936.

On and after the 4th day of December, 1936, a copy of the Bill may be inspected and copies thereof obtained at a price not exceeding three shillings for each copy, at the offices of the undermentioned Solicitor and Parliamentary Agents and at the Stationmaster's Office at the following railway stations of the Company, viz., Reading, Lewes, Maidstone (West), Winchester and Guildford.

And Notice is hereby also given that on or before the 20th day of November, 1936, plans and sections relating to the said intended works and plans of all lands which may be taken or used compulsorily with a book of reference to such plans were deposited for public inspection as follows (that is to say):—

As regards works and lands in the County of Kent with the Clerk of the County Council of that County at his office at Maidstone; as regards works and lands in the County of Surrey with the Clerk of the County Council of that County at his office at Kingston-upon-Thames; as regards works and lands in the County of West Sussex with the Clerk of the County Council of that County at his office at Chichester; as regards works and lands in the County of Southampton with the Clerk of the County Council of that County at his office at Winchester; as regards lands in the County of Berks with the Clerk of the County Council of that County at his office at Reading; and as regards lands in the County of East Sussex with the Clerk of the County Council of that County at his office at Lewes.

And that copies of so much of the said plans, sections and book of reference as relates to each of the several areas hereinafter mentioned in or through which the said intended works are proposed to be made or lands are situate, were on or before the said 20th day of November deposited for public inspection as follows (that is to say):—

As relates to the City of Chichester with the Town Clerk of that City at his office, as relates to any borough with the Town Clerk of that borough at his office; as relates to any urban district (not being a borough) or to any rural district with the Clerk of the district council of such district at his office; and as relates to any parish comprised in a rural district with the Clerk of the parish council of such parish at his residence.

Dated this 7th day of December, 1936.

WM. BISHOP,
Waterloo Station,
London, S.E.1.
Solicitor.

SHERWOOD & CO.,
Clarence House,
4, Central Buildings,
Westminster, S.W.1.
Parliamentary Agents.

IMPORTANT RUSSIAN LINE COMPLETED.—The 165-mile Uralsk-Ilesk line at the southern extremity of the Urals has been finished recently, and will provide a valuable alternative to the Samara-Ufa-Cheliabinsk line for through traffic between the Donbass, Caucasus and lower Volga on the one hand and the Sverdlovsk and (via the Trans-Siberian Railway) Novosibirsk industrial districts on the other. Further, it will provide a second direct route from the south and west of European Russia to both Razakstan and Tashkent.

EASTERN SIBERIAN RAILWAY OPENED TO KOMSOMOLSK.—Komsomolsk, a fishing village three years ago, now has a population of about 50,000 and is the Amur River port of, and an important budding industrial centre in, Eastern Siberia. Though reports contradict one another, and correct information as to which of the two projected railways to Komsomolsk has now been completed remains shrouded in mystery, it seems certain that the first train from Moscow has arrived at that town via one of them. In our issue of December 27, 1935, we fully explained the railway position in that area and published a map showing the various lines then under construction or proposed. The two lines now concerned are (*a*) the strategic alternative alignment parallel to the trans-Siberian Railway, which leaves the latter at Never and, after diverging from it for 200 miles, runs roughly parallel for another 600 miles to both the old line and the Manchukuo frontier, but some 200 instead of only 20-100 miles distant from the latter. The second line (*b*) runs from Harbarovsk to connect with (*a*) at or near Komsomolsk, parallel to the Amur River, and is only about 250 miles in length. Although some 200 miles of (*a*) had been laid a year ago, it seems more likely that (*b*) is the line now completed, though it does not, of course, give the immunity from sudden attack claimed for (*a*), and stressed by the Soviet authorities in connection with the arrival of the first train at Komsomolsk. Neither (*a*) nor (*b*) should be confused with the further-retired line north of Lake Baikal, which, however, is common to (*a*) over its last 600 miles.

Forthcoming Events

Dec. 11 (*Fri.*).—Institute of Transport (Newcastle), at Royal Station Hotel, 7.30 p.m. "Elements to Consider in Co-ordination of Transport," by Mr. M. Barnard.

Institute of Transport (Newcastle Graduate), at Royal Station Hotel, 6 p.m. "The German Railways," by Mr. E. Arkle.

Institute of Welding (Midlands), at James Watt Inst., Newhall Street, 7.15 p.m. "The Behaviour of the Arc," by Mr. T. Nixon.

Railway Club, at Broad Street Station Restaurant, London, E.C.2, 7.30 p.m. Annual Dinner.

Railway Students' Association (Edinburgh), at Goold Hall, St. Andrew Square, 7.30 p.m. "Rail and Road," by Mr. I. MacGregor.

Dec. 12 (*Sat.*).—Permanent Way Institution (Manchester-Liverpool), at L.M.S.R. Staff Dining Room, Hunts Bank, Manchester, 3 p.m. Discussion: "Permanent Way Maintenance."

Stephenson Locomotive Society (London), at L.N.E.R. Dining Club, King's Cross Station, N.1, 2.30 p.m. Annual General Meeting. Annual Dinner, at Maison Lyons, Shaftesbury Avenue, W.1, 6.30 p.m.

Dec. 14 (*Mon.*).—Engineers' German Circle, at Inst. of Mechanical Engineers, Storey's Gate, London, S.W.1, 6 p.m. "Self Propelled Railcars of the German State Railways," by Herr Reichbahndirektor Stroebe.

Institute of Transport (London), at Inst. of Electrical Engineers, Savoy Place, W.C.2, 5.30 p.m. "Transport from an Operating Trader's Viewpoint," by Mr. W. Gaunt.

Institute of Transport (Scottish), at Grosvenor Restaurant, Gordon Street, Glasgow, 7.15 p.m. "The Regulation of Street Traffic," by Mr. R. Beveridge.

Institute of Welding (Tyneside), at Armstrong College, Newcastle, 7.30 p.m. "The Application of Welding to Oil Engines," by Dr. W. Burn.

Dec. 15 (*Tues.*).—Permanent Way Institution (Scottish), at Royal Technical College, George Street, Glasgow, 7.30 p.m. "Track Circuiting," by Mr. W. Bowman.

Dec. 16 (*Wed.*).—Institute of Transport (Manchester-Liverpool Graduate), at Central Library, Manchester, 6.30 p.m. "Municipal Transport Operation," by Mr. J. Gillanders.

Institute of Welding (Manchester), at College of Technology, 7.30 p.m. "Developments in Resistance Welding," by Mr. L. Wilson.

Institution of Railway Signal Engineers, at Inst. of Electrical Engineers, Savoy Place, London, W.C.2, 6 p.m. "A Chronological Record of the Protection of Facing Points," by Mr. R. Griffiths.

L.N.E.R. (Middlesbrough) Lecture and Debating Society. Joint Meeting with Darlington Society. Debate: "That it is Not in the Best Interests of the Railway Company to Participate in Long Distance Road Transport." Affirmative: Darlington Society. Negative: Middlesbrough Society.

Dec. 17 (*Thurs.*).—Institute of Welding (Leeds), at Griffin Hotel, 7.30 p.m. "Electric Welding Plants," by Mr. T. Nixon.

Institution of Electrical Engineers, Savoy Place, London, W.C.2, 6 p.m. "The Micro-Gap Switch," by Prof. W. Thornton. "Restriking Voltage and its Import in Circuit Breaker Operation," by Messrs. H. Trencham and K. Wilkinson.

Institution of Locomotive Engineers (Scottish), at Royal Technical College, Glasgow, 7.30 p.m. Graduates' Papers.

Permanent Way Institution (Brighton), at Welfare Room, New England Street, 7 p.m. "A Scandinavian Journey," by Mr. W. A. Willox.

Société des Ingénieurs Civils de France, at Inst. of Mechanical Engineers, Storey's Gate, London, S.W.1, 6 p.m. "Air Conditioning and Heating of Railway Carriages," by M. E. Damond.

Dec. 18 (*Fri.*).—Institute of Transport (Manchester-Liverpool), at Exchange Station Hotel, Liverpool, 6.30 p.m. "The Ground Services Essential to the Safety of Air Transport, by Mr. H. Andrews.

Dec. 19 (*Sat.*).—L.N.E.R. Musical Society, at Queen's Hall, Langham Place, London, W.1, 8 p.m. Carol Concert.

Dec. 21 (*Mon.*).—Institute of Welding (Teesside), at Cleveland Scientific Inst., Corporation Road, Middlesbrough, 7.30 p.m. "Welding of Non-Ferrous Metals," by Mr. E. Partington.

XUM

Railway Share Market

The stock and share markets have been inactive, pending further developments in connection with the constitutional crisis and the general trend has been to lower prices. Towards the middle of the week Home railway stocks showed a rather firmer tendency and this was fairly well maintained in view of the encouraging nature of the past week's traffics, which, however, may include the end monthly "sweepings." The better figures reflect improved goods and passenger receipts, and as against considerable losses in recent weeks, the decline in coal receipts was only £500.

L.M.S.R. ordinary was more active around 31¼ on the traffic gain of £49,000, and the 4 per cent. and 1923 preference were also in better demand subsequently. There was a slightly improved tendency in L.N.E.R. stocks on the traffic increase of £42,000—the best return for some weeks. The first preference was favoured on a wider realisation that there are good prospects of its full dividend being paid and that on this basis an apparently attractive yield would be offered at the present price. Great Western ordinary at 60¼ was relatively dull, despite the traffic gain of £25,000, but there was rather more business reported in Southern deferred and preferred, the lower prices made earlier in the week having brought in buyers, particularly as the traffic improvement of £20,000 was in excess of anticipations. Debentures and guaranteed stocks were reported to be rather firmer in sympathy with British Government stocks. A point of interest was improvement in London Transport "C" which rallied to 95.

Argentine stocks were again the chief centre of interest in the foreign railway market, largely owing to encouraging views as to the trend of traffic receipts in the more immediate future. Central Argentine was good at 26½, there being particularly favourable views current as to the traffic outlook in this case, but B.A. Gt. Southern was also active at 26¼ and increased attention was given to B.A. Western. B.A. Pacific at 12½ was rather less prominent, but is also fractionally higher on balance. Most prior charge stocks moved moderately in favour of holders. Elsewhere, Antofagasta and San Paulo were better, but Leopoldina issues were reactionary owing to talk in the market of the possibility of a moratorium scheme in respect of the debentures. American railroad stocks were firmer and Canadian Pacific ordinary and preference made slightly better prices.

Traffic Table of Overseas and Foreign Railways Publishing Weekly Returns

	Railways	Miles open 1935-36	Week Ending	Traffics for Week: Total this year	Traffics for Week: Inc. or Dec. compared with 1935	No. of Weeks	Aggregate Traffics to Date: Totals: This Year	Aggregate Traffics to Date: Totals: Last Year	Aggregate Traffics to Date: Increase or Decrease	Shares or Stock	Prices: Highest 1935	Prices: Lowest 1935	Prices: Dec. 9, 1936	Prices: Yield (see Note)
				£	£		£	£	£					
South Central America.	Antofagasta (Chili) & Bolivia	834	6.12.36	16,380	— 610	49	684,300	613,510	+ 68,790	Ord. Stk.	23	14 15/16	22	Nil
	Argentine North Eastern	753	5.12.36	9,300	+ 1,292	23	215,984	188,884	+ 27,100	,,	7	4	8 1/2	Nil
	Argentine Transandine	—	—	—	—	—	—	—	—	A. Deb.	49 1/2	30	52 1/2§	7 5/8
	Bolivar	174	Nov., 1936	5,000	— 1,000	48	68,600	66,600	+ 2,000	6 p.c. Deb.	13	5	7 1/2	Nil
	Brazil	—	—	—	—	—	—	—	—	Bonds.	14	11	16	3
	Buenos Ayres & Pacific	2,806	5.12.36	80,882	+ 2,621	23	1,737,929	1,698,514	+ 39,415	Ord. Stk.	101 1/2	47 8	121 1/2	Nil
	Buenos Ayres Central	190	21.11.36	$152,900	+ $29,300	21	$2,994,100	$2,595,800	+ $398,800	Mt. Deb.	21	10	28 1/2	Nil
	Buenos Ayres Gt. Southern	5,084	5.12.36	123,941	+ 4,728	23	2,587,196	2,720,055	— 132,859	Ord. Stk.	27	13 1/2	26	Nil
	Buenos Ayres Western	1,930	5.12.36	51,765	+ 6,230	23	948,055	921,361	+ 26,694	,,	24	10	24	Nil
	Central Argentine	3,700	5.12.36	139,309	+ 38,398	23	3,160,283	2,679,104	+ 481,179	,,	17 7/8	7	26	Nil
	Do.	—	—	—	—	—	—	—	—	Dfd.	9	3 1/4	13 1/2	Nil
	Cent. Uruguay of M. Video	273	28.11.36	14,175	+ 74	22	257,432	212,661	+ 34,771	Ord. Stk.	8 1/2	3	5 1/2	Nil
	Do. Eastern Extn.	311	28.11.36	2,788	— 234	22	42,425	34,868	+ 7,557	—	—	—	—	—
	Do. Northern Extn.	185	28.11.36	1,386	— 51	22	30,058	25,341	+ 4,717	—	—	—	—	—
	Do. Western Extn.	211	28.11.36	1,055	+ 143	22	22,035	16,731	+ 5,305	—	—	—	—	—
	Cordoba Central	1,218	5.12.36	34,410	+ 4,150	23	743,190	707,830	+ 35,360	Ord. Inc.	4	1	3 1/2	Nil
	Costa Rica	188	Oct., 1936	19,226	+ 7,592	18	71,989	55,349	+ 16,640	Stk.	35	30	36	5 9/16
	Dorada	70	Oct., 1936	15,100	+ 3,200	44	141,700	117,400	+ 24,300	1 Mt. Db.	103 5/8	102 1/2	104 1/2	5 1/4
	Entre Rios	810	5.12.36	14,417	+ 3,512	23	293,095	265,315	+ 27,780	Ord. Stk.	15	6 1/2	12	Nil
	Great Western of Brazil	1,082	5.12.36	11,500	— 300	49	391,500	381,500	+ 10,000	Ord. Sh.	1/2	3/16	5/4	Nil
	International of Cl. Amer.	794	Oct., 1936	$294,126	— $591	44	$4,223,770	$3,843,882	+ $379,888	—	—	—	—	—
	Interoceanic of Mexico	—	—	—	—	—	—	—	—	1st Pref.	1/2	5/32	1/2	Nil
	La Guaira & Caracas	22¾	Nov., 1936	4,625	+ 1,365	48	50,475	41,145	+ 9,330	S k.	8 1/2	8	5 1/2	Nil
	Leopoldina	1,918	5.12.36	24,758	+ 5,599	49	968,533	879,030	+ 89,503	Ord Stk.	8 1/2	2 1/2	6	Nil
	Mexican	483	30.11.36	$356,300	+ $17,900	22	$5,797,700	$5,458,500	+ $339,100	,,	1 1/2	1/4	1/2	Nil
	Midland of Uruguay	319	Oct., 1936	8,771	+ 2,167	18	32,198	22,939	+ 9,259	,,	1 1/2	1 1/2	1/2	Nil
	Nitrate	397	30.11.36	1,639	— 7,145	48	109,544	139,621	— 30,077	Ord. Sh.	64/-	42/-	2 1/2	Nil
	Paraguay Central	274	5.12.36	$2,965,000	— $531,000	23	$57,536,000	$51,269,000	+ $6,267,000	Pr. Li. Stk.	80 1/2	60	78 1/2	7 5/8
	Peruvian Corporation	1,059	Nov., 1936	70,222	— 5,903	22	409,273	375,790	+ 33,483	Pref.	10 5/8	6 7/16	10	Nil
	Salvador	100	28.11.36	c18,200	+ c3,790	22	c252,308	c263,846	— c11,538	Pr. Li. Db.	65	61	15	Nil
	San Paulo	153¾	29.11.36	35,038	+ 9,893	48	1,408,639	1,172,258	+ 236,381	Ord. Stk.	80	35	83	3
	Taltal	164	Nov. 1936	4,390	+ 385	22	16,810	16,645	+ 165	Ord. Sh.	11 1/16	11 8	11 8	87 8
	United of Havana	1,353	5.12.36	17,858	+ 4,262	23	351,734	356,170	— 4,436	Ord. Stk.	3 1/16	1	2 1/2	Nil
	Uruguay Northern	73	Oct., 1936	1,162	+ 381	18	3,751	2,578	+ 1,173	Deb. Stk.	4 1/2	2 15/16	5 1/2	Nil
Canada.	Canadian National	23,613	30.11.36	926,614	+ 9,848	48	33,877,252	31,641,959	+ 2,235,293	—	—	—	—	—
	Canadian Northern	—	—	—	—	—	—	—	— 4 p.c.	Perp. Dbs.	78 5/8	52 1/2	74 1/8§	5 7/8
	Grand Trunk	—	—	—	—	—	—	—	—	4 p.c. Gar.	103 5/8	93	102 1/8§	3 7/8
	Canadian Pacific	17,220	30.11.36	710,800	— 18,600	48	25,262,000	23,619,600	+ 1,642,400	Ord. Stk.	14 1/16	8 5/8	13 1/2	Nil
India.†	Assam Bengal	1,329	10.11.36	42,472	+ 3,109	32	777,959	748,809	+ 29,141	Ord. Stk.	92 1/8	77 1/2	86 1/2	3 7/16
	Barsi Light	202	10.11.36	2,362	— 2,520	32	68,295	84,683	— 16,388	Ord. Sh.	10 5/8	7 7/12	6 6/12	7 1/2
	Bengal & North Western	2,112	10.11.36	76,060	+ 5,864	32	299,704	260,870	+ 29,834	Ord. Stk.	301 1/2	291	300	5 5/16
	Bengal Dooars & Extension	161	20.11.36	3,951	— 1,205	34	85,895	90,939	— 5,044	,,	127 1/2	122	120 1/2	5 15/16
	Bengal-Nagpur	3,268	20.11.36	135,000	— 41,837	34	3,791,699	4,051,781	— 260,082	,,	10 5/8	100 5/16	101 1/8§	3 15/16
	Bombay, Baroda & Cl. India	3,072	30.11.36	260,175	+ 11,475	35	5,382,675	5,236,200	+ 146,475	,,	115 1/4	110	110 1/8§	5 7/16
	Madras & Southern Mahratta	3,229	20.11.36	132,450	— 3,790	34	3,379,088	3,390,016	— 10,928	,,	128 1/2	113 7/8	110 1/2§	6 1/8
	Rohilkund & Kumaon	572	10.11.36	11,357	— 752	32	47,003	45,632	+ 1,371	,,	29 4	26 2	30 8	5 5/16
	South Indian	2,532	20.11.36	94,709	+ 2,266	34	2,573,264	2,552,263	+ 21,001	,,	119 3/4	104 1/4	103 1/2	5 9/16
Various.	Beira-Umtali	204	Sept., 1936	84,059	+ 24,443	52	803,277	769,888	+ 33,389	—	—	—	—	—
	Bilbao River & Cantabrian	15	Oct., 1936	977	— 718	44	14,608	15,053	— 445	—	—	—	—	—
	Egyptian Delta	620	20.11.36	9,674	— 576	34	158,078	154,551	+ 3,527	Prf. Sh.	2	15 8	1 1/4	5 11/16
	Great Southern of Spain	104	29.8.36	568	— 2,514	35	33,629	62,623	— 28,994	Inc. Deb.	3 1/2	2	3 1/2	Nil
	Kenya & Uganda	1,625	Oct., 1936	181,657	— 11,959	44	2,129,052	2,003,110	+ 125,942	—	—	—	—	—
	Manila	—	—	—	—	—	—	—	—	B. Deb.	48	36	46 1/2	7 1/2
	Mashonaland	913	Sept., 1936	120,223	+ 13,530	52	1,252,141	1,384,055	— 131,914	1 Mg. Db.	104 1/4	100	103	4 7/8
	Midland of W. Australia	277	Oct., 1936	17,220	+ 160	18	54,055	54,263	— 208	Inc. Deb.	98 3/4	93	96 1/2	4 1/8
	Nigerian	1,905	24.10.36	70,896	— 1,233	30	940,239	743,158	+ 197,081	—	—	—	—	—
	Rhodesia	1,538	Sept., 1936	215,585	+ 22,258	52	2,291,219	2,320,250	— 29,031	4 p.c. Db.	105 1/2	101	104 1/2	3 15/16
	South Africa	13,263	14.11.36	632,824	+ 35,788	32	19,891,582	18,274,163	+ 1,617,419	—	—	—	—	—
	Victoria	4,728	July, 1936	713,074	— 315	4	713,074	713,389	— 315	—	—	—	—	—
	Zafra & Huelva	112	Oct., 1936	14,665	+ 1,978	44	80,613	114,122	— 33,509	—	—	—	—	—

NOTE.—Yields are based on the approximate current prices and are within a fraction of 1/16.

† Receipts are calculated @ 1s. 6d. to the rupee. § ex dividend. Salvador and Paraguay Central receipts are in currency.

The variation in Sterling value of the Argentine paper peso has lately been so great that the method of converting the Sterling weekly receipts at the par rate of exchange has proved misleading, the amount being overestimated. The statements from July 1 onwards are based on the current rates of exchange and not on the par value.

Electric Railway Traction

ELECTRIFICATION IN SOUTH AFRICA

THE electrification of the heavily-graded main line from Durban to Cato Ridge is now completed, but it is expected that a month or two will elapse before a full electric service can be introduced, owing to the number of electric locomotives available at the moment being insufficient. The short Point-Congella line and the Congella yard were electrified during last summer, but additional sidings in the yard have been wired from time to time since.

Further north, the electrification of the Glencoe—Volksrust mountain section is being effected in conjunction with the elimination of the reversing stations and the carrying out of other track improvements along the route. Some of the latter works, particularly the heavy deviations north of Ingogo, are not expected to be completed before 1940, and because of this, and of the desire to obtain as soon as practicable the full financial and other benefits of electrification, the existing line from Newcastle to Volksrust is being equipped temporarily for electric traction. This will permit of the introduction of electric operation over the throughout route about the summer of 1937, and it is not expected that the additional cost will exceed £15,000. As part of a comprehensive scheme for the improvement of rail transport facilities in the Witwatersrand area, the following routes are now being electrified at 3,000 volts d.c.:—

Randfontein—Springs.
Germiston—Pretoria.
Apex—Welgedacht via Geduld.
Langlaagte—Canada—Pimville.
Canada—Booysens—Eloff Street Extension.
President—Alberton.
India Junction—Wattles.

The total route mileage involved is 126, and the track mileage 310. Electric traction will be restricted to the urban and suburban passenger traffic, leaving the goods and long-distance passenger trains passing over the main lines in the electrified area to be worked by steam, and the tracks will be fed by eight mercury arc rectifier substations. The railway portion of the entire scheme is estimated to cost £1,129,620. Against this must be offset the replace value of the many serviceable steam locomotives which will be available for employment elsewhere and the value of other rolling-stock equipment which would have had to be purchased in any case to cope with the growing demands of traffic. The work is expected to be sufficiently advanced by the summer of 1937 to permit of electric running over a number of sections. In a general way electrification in South Africa costs about £1,500 per mile, compared with the £4,200 per mile of the original Pietermaritzburg—Glencoe conversion. At the present time there are 302 route miles of railways (the equivalent of 514 single track miles) operated by electric traction in the Union. When the schemes detailed in the preceding paragraphs have been completed, this total will be increased to 551 route miles, or 1,050 single track miles equivalent, constituting one of the largest individual systems of electrified railways in the world, and one of the most up-to-date. Traffic over the electrified portion of the Natal main line increased by 28 per cent. during the last fiscal period to a total of 6½ million tons, and further increase has been recorded since. Although a loss is still being registered on the Capetown electrified suburban system the deficit is being reduced year after year, and in the last fiscal year the number of passenger journeys increased by 8½ per cent. and the loss decreased by 15 per cent. to £122,500.

Electricity Supply

During last year about 154,000,000 kWh. of energy were obtained for traction purposes from the Colenso and Salt River power stations, and the cost was approximately £375,000. From July, 1935, new tariff charges have been in force for both generating plants. The previous tariff for traction current was:—

(*a*) A fixed charge of £210,000 per annum.
(*b*) 0·3d. per unit for the first 1,000,000 units supplied each year from each substation.
(*c*) 0·2d. per unit for the next 2,000,000 units supplied each year from each substation.
(*d*) 0·15d. per unit for the remaining number of units supplied each year from each substation.

The amended tariff is as follows:—

(*a*) A fixed charge of £214,000 per annum.
(*b*) 0·2d. per unit for the first 250,000 units supplied each month from each substation.
(*c*) 0·15d. per unit for the balance supplied each month from each substation.

The new tariff, together with increased consumption of electricity due to expanding traffic and extensions to the electrified system, has resulted in an appreciable decrease in the cost per unit, which for the last fiscal year was 0·5834d., as against 0·7753d. per unit in the previous year.

At Capetown, current supplied by the Salt River power station also showed a reduction in price, the respective figures being 0·7659d. and 0·9223d. for the last and penultimate financial years. As in the case of Natal, a revision of the tariff rates contributed towards the reduction shown. Up to February, 1935, the tariff at Capetown was:—

(*a*) A fixed charge of £100,000 per annum.
(*b*) 0·5d. per unit for the first 100,000 units supplied each month from each substation.
(*c*) 0·4d. per unit for the next 200,000 units supplied each month from each substation.
(*d*) 0·3d. for the remaining number of units supplied each month from each substation.

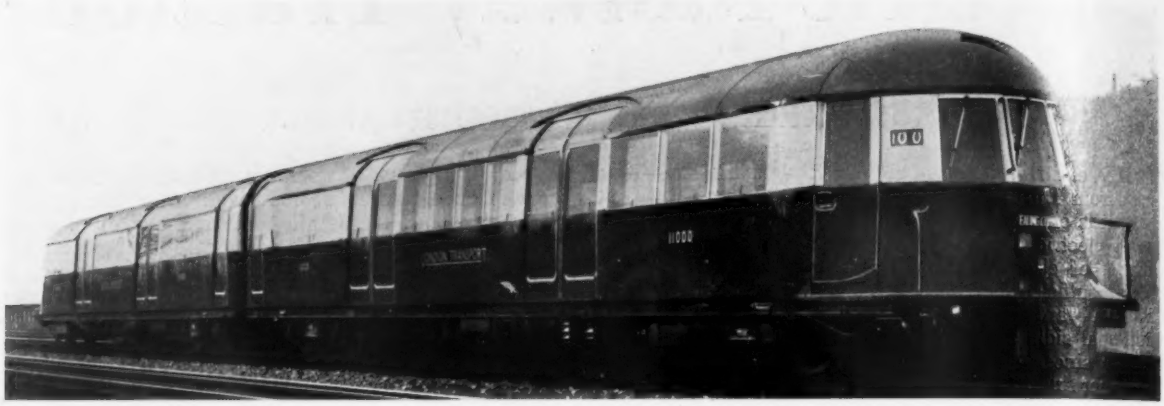
The revised tariff is as follows:—

(*a*) A fixed charge of £100,609 per annum.
(*b*) 0·5d. per unit for the first 100,000 units supplied each month from each substation.
(*c*) 0·4d. per unit for the next 200,000 units supplied each month from each substation.
(*d*) 0·3d. per unit for the next 200,000 units supplied each month from each substation.
(*e*) 0·275d. per unit for all additional units supplied each month.

XUM

FASTER TRAINS FOR LONDON UNDERGROUND

1,656 *h.p. six-car sets with varying electrical equipment*



A portion of one of the four new 600-volt d.c. trains for the London Passenger Transport Board

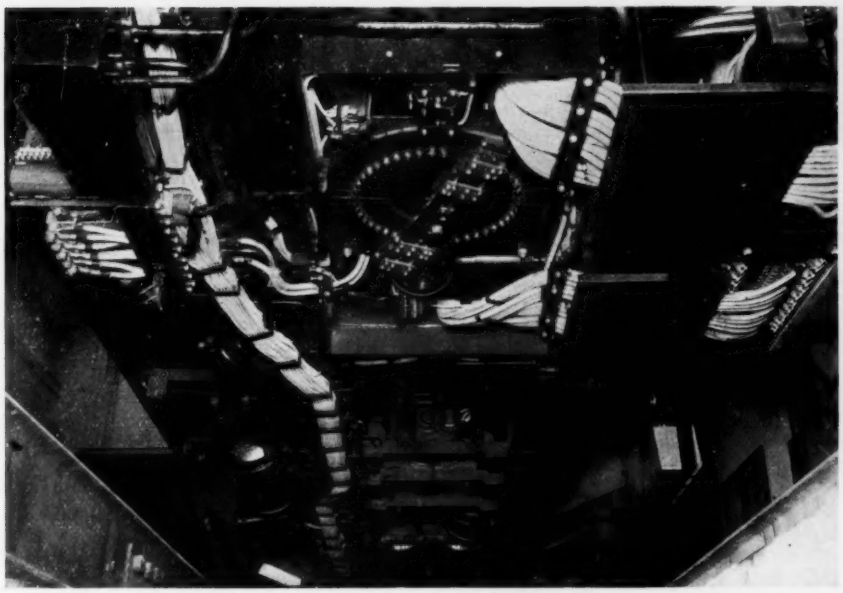
FOUR electric trains are to be introduced on the Piccadilly line of the London Passenger Transport Board within the next few weeks, and by reason of their higher acceleration and retardation rates and a greater passenger accommodation they will enable the capacity of that line to be increased. Ultimately it is hoped that if and when a complete section can be operated with trains similar to these, the capacity will be increased to 45 trains an hour compared with the present figure of 40.

The four new six-car trains, built by the Metropolitan-Cammell Carriage & Wagon Co. Ltd., are regarded as experimental units, in order to decide the form the equipment shall take on the large number of new vehicles which the board will require later. The principal feature is that all the electrical equipment is located beneath the floor, and by the suppression of the normal equipment compartment the carrying capacity of the six-car train has been made equivalent to that of a seven-coach set of normal construction.

The 138 h.p. motors of all the trains have been made by Crompton Parkinson Limited, but each train has a different system of control, evolved and manufactured by the Metropolitan-Vickers Electrical Co. Ltd., the British Thomson-Houston Co. Ltd., the General Electric Co. Ltd., and Allen, West & Co. Ltd. respectively. The first make has an oil-driven power drum for performing all resistance switching, and giving a total of 45 notches. B.T.H. has put forward the American PCM system incorporating a number of air-operated units controlled by magnet valves. The G.E.C. system includes a camshaft driven by a servo motor and giving a total of 56 notches in series, parallel and weakened field grouping. The Allen-West method makes use of faceplate controllers, one for each motor circuit, which give 19 notches in series, in parallel, and in parallel with weakened field, but this firm has proposed also two further schemes, one similar to the last but without series grouping, and the other with a motor-driven camshaft cutting out the resistances.

Increased acceleration, up to 2·0 m.p.h.p.s., has been achieved by motoring half the axles down the train, thus giving greater adhesion weight; by a reduction in train weight; and by a multi-point control apparatus which allows the accelerating current to be increased nearer the slipping point by the reduction of peaks. The braking system has been given special attention, and as all the electrical equipment is beneath the floor the usual form of underframe brake rigging is impossible. The type of electro-pneumatic brake fitted was evolved by the Westinghouse Brake & Signal Co. Ltd. in conjunction with the Underground engineers, and gives a retardation rate of 3·0 m.p.h.p.s. It comprises independent wheel braking

Interior of new train for the Piccadilly line



View beneath one of the new L.P.T.B. tube cars showing the Crompton Parkinson-Allen West traction equipment, including one of the faceplate controllers. The depth available between the floor and the rail clearance line of the loading gauge is only 16 in., and into this is packed all the control and auxiliary equipment

with two shoes per wheel and one cylinder per shoe; self-lapping control, and a retardation controller.

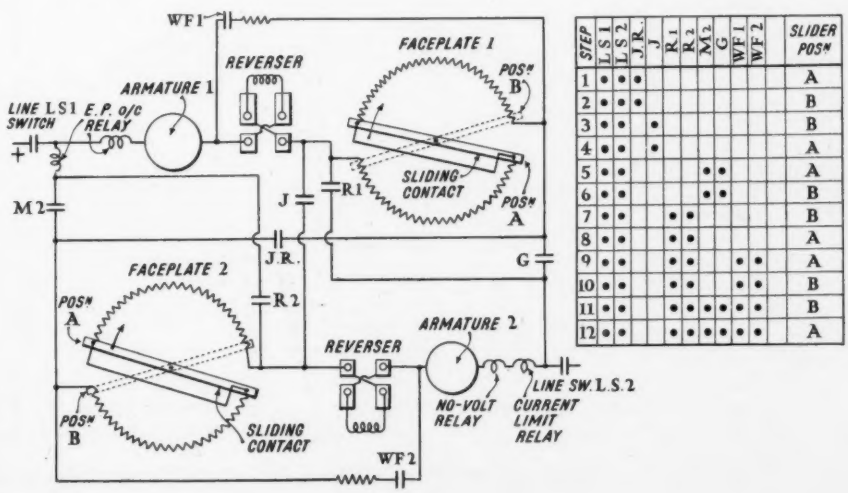
Electrical Equipment

The traction control is of special interest, as it is a complete departure from normal practice. Allen West & Co. Ltd. has put forward three schemes, one for each unit of a train. The first is a series-parallel arrangement using two faceplate controllers (one for each motor circuit), for cutting out the starting resistances; both faceplates are driven by one 50-volt pilot motor. Each faceplate has 20 segments arranged in a circle and bridged by a slider arm which makes one revolution for each of the series, parallel and weak-field positions, *i.e.*, a total of 57 notches for the complete sequence. An electro-pneumatically-operated camshaft contactor unit is provided to make the necessary group connections to the main motor circuit. Interlock drums are provided on both the faceplates and the cam group, which ensures correct sequencing. A double-pole line switch, together with pneumatic overloads electrically tripped and set are also included.

In the second scheme, Allen West has designed a straight parallel equipment. This also takes the form of a motor-operated faceplate controller, only one of which is necessary in this case. The traction motors operated by this system will be 600-volt connected permanently in full parallel.

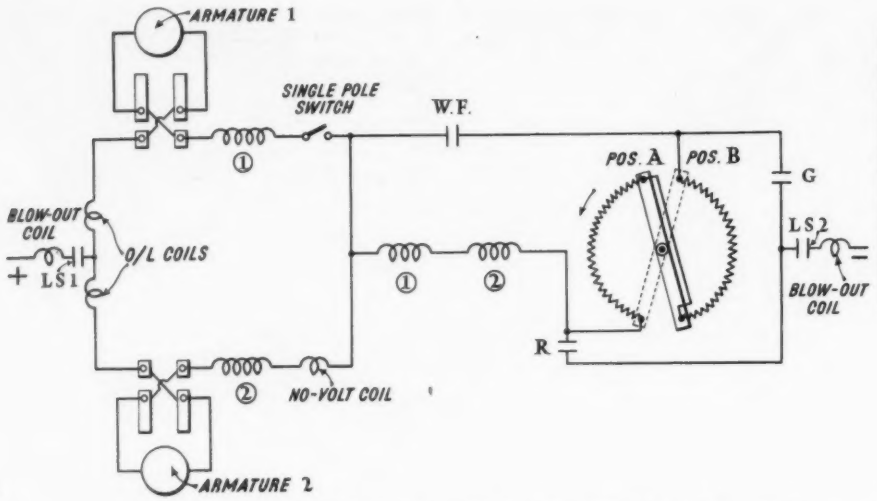
It is hoped that with these two types of equipment it will be possible to determine whether with the increased acceleration the saving in current consumption in the series-parallel scheme will compensate for the increased complication over the comparatively simple arrangement of the straight parallel system. The third scheme incorporates a motor-driven camshaft for cutting out the motor resistances, the cam-operated contactors being arranged on either side. The remainder of this apparatus follows the same general principle as the previous two schemes.

The General Electric Co. Ltd. also employs a resistance camshaft, but of different design. The camshaft, which is driven by a 50-volt servo motor, is used for series, parallel and field control, and makes three revolutions from the off position to final weak field, a total of 56 notches. Series-parallel grouping and the changeover to weak field is carried out by two electro-pneumatically-operated cam groups. Three electro-pneumatic contactors



STEP	LS1	LS2	J.R.	J	R1	R2	M2	G	WF1	WF2	SLIDER POS#
1	•	•	•								A
2	•	•	•								B
3	•	•		•							B
4	•	•		•							A
5	•	•					•	•			A
6	•	•					•	•			B
7	•	•			•	•					B
8	•	•			•	•					A
9	•	•			•	•			•	•	A
10	•	•			•	•			•	•	B
11	•	•			•	•	•	•	•	•	B
12	•	•			•	•	•	•	•	•	A

Diagram showing power circuits of the double face-plate type of control evolved by Allen West & Co. Ltd. and applied to one of the new tube trains



NOTCH	LS 1	LS 2	G	R	W F	FACE PLATE POSITION
1	•	•	•			A
2	•	•	•			B
3	•	•	•	•		B
4	•	•		•		B
5	•	•		•		A
6	•	•		•	•	A
7	•	•		•	•	B
8	•	•	•	•	◦	B
9	•	•	•		•	A

Diagram of power circuits for Allen-West single face-plate control scheme

are also used, two of which are used as line switches, the third being used for transition. One feature of this control scheme is that acceleration is based on time, with an overriding current control which acts on the servo motor field, slowing the resistance camshaft down if the main motor current increases above a pre-determined maximum.

The British Thomson-Houston system consists of a number of air-operated units controlled by magnet valves. By an unusual arrangement of motor and resistance circuits the camshaft controller is arranged to cut out resistance during series acceleration by rotating in one direction, and after transition from series to parallel reverses its direction to cut out the resistance again in returning to its off position.

The camshaft controller is driven by a pneumatic power through two cylinders, the pistons of which are connected together by a rack. Oil under pressure is used to drive the camshaft forward, and air pressure is used to return it to the off position. A star wheel is included in the mechanism, together with a pawl which is locked electrically by the accelerating relay and released under current

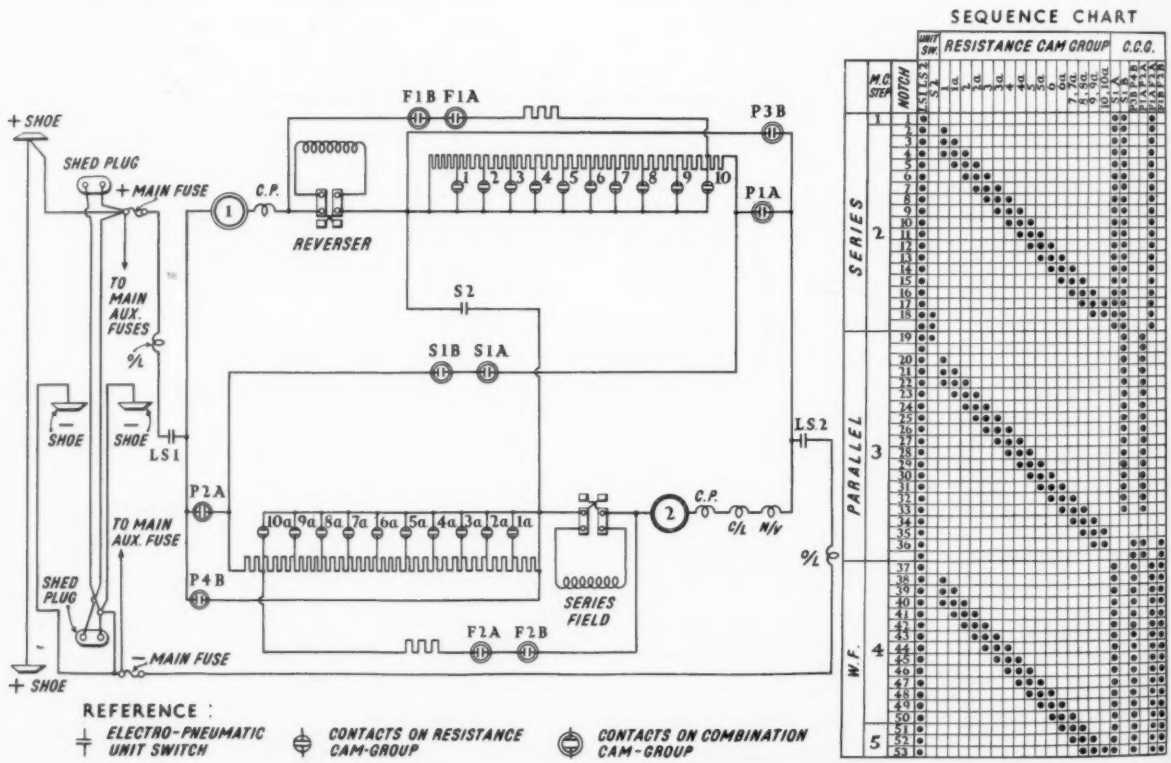


Diagram of main circuits of G.E.C. control for new Underground train

control, thus enabling the camshaft to advance step by step.

A series-parallel transfer switch is provided, consisting of an electro-pneumatic switch with a single air cylinder operating three cam contactors, one of which is normally open, and the other two normally closed. The operation of three contacts by a single unit ensures a quick positive transition without the need for electrical or mechanical interlocking between separate transition contactors.

The Metro-Vick control scheme has an oil-driven power drum for performing all resistance switching, giving a total of 45 notches. The arranging of the different resistance values is also unusual, as these are obtained by first cutting the major part of the resistance gradually out of the circuit, and then further reducing the values by a system of paralleling. In this way a large number of values is obtained, with a comparatively small number of resistance sections and connections. Further, the heating of the resistances is more evenly distributed over the whole bank.

The problem of driving the drum round slowly and stopping it accurately has been overcome, and the arrangement of drum development and resistance connections is such that a resistance finger never breaks circuit before it has already been short-circuited by another finger. In this way the only arcing which occurs on the drum is due to the small spit when a finger makes contact, and special provision to deal with this has been introduced. Six electro-pneumatic unit switches are used, four as line switches, and two for transition; the usual form of electro-pneumatic reverser is included.

In all the traction equipments the control is operated from a 50-volt supply, and so far as main power and control equipment are concerned, each car is separate and complete. The line switches are arranged to carry out all main current breaking, the resistance switches never being called upon to break under load.

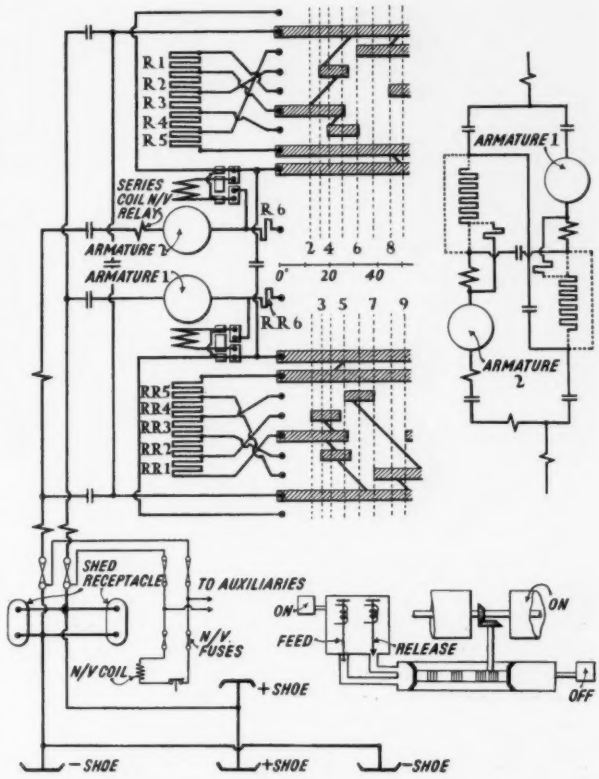


Diagram of main circuits of Metro-Vick control scheme for L.P.T.B. tube train

Bodies and Underframes

Each car is 52 ft. 6 in. over headstocks and has a normal seating capacity of 40, the seats themselves being of the pattern used on the Green Line road buses. The underframes are of welded steel sections with the centre longitudinals forming the air ducts for the experimental forced ventilation of the Stone type, which is being fitted to two cars of the first train. Here the usual ventilators

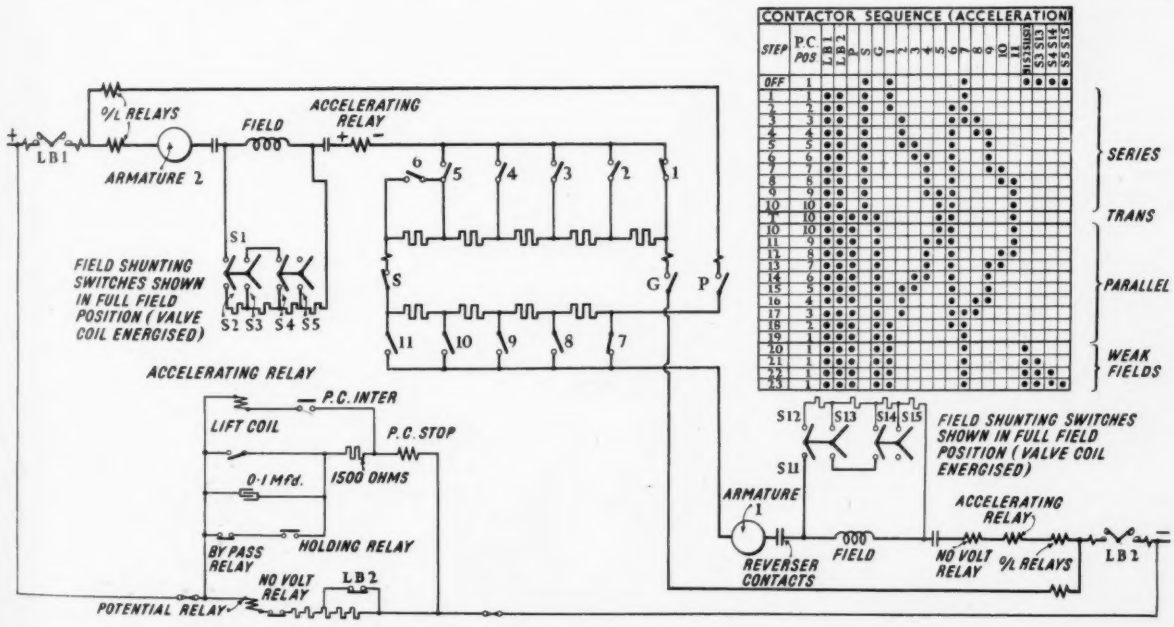


Diagram of P.C.M. control fitted by the B.T.H. Company to London tube trains

above the windows have been eliminated, and the windows have fixed double glasses with an air space between. The air supply is thermostatically controlled, and during winter months on open sections of the line will be electrically heated from the 600-volt traction line.

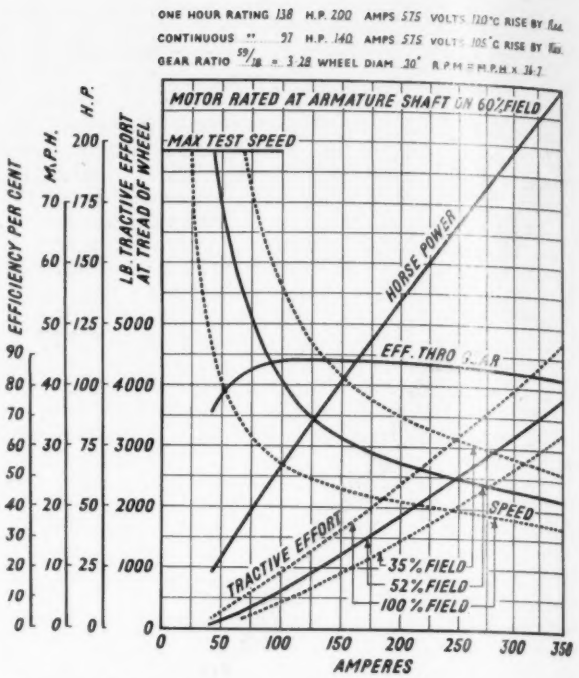
The outside of the cars presents a flush appearance, the main windows being brought out level with the car panels by using rebated glass. Main pillars have been reduced to a minimum; they are of triangular section, giving the smallest possible obstruction to the passenger's view and are chromium-plated.

The lighting, from lamps in parallel circuit, is obtained from the 50-volt supply, generated by a 5 kW. motor-generator set on each two-car unit. Lighting fittings have been specially designed, and consist of fluted oblong shades housed in chromium-plated frames and located in a line on either side of the centre roof section.

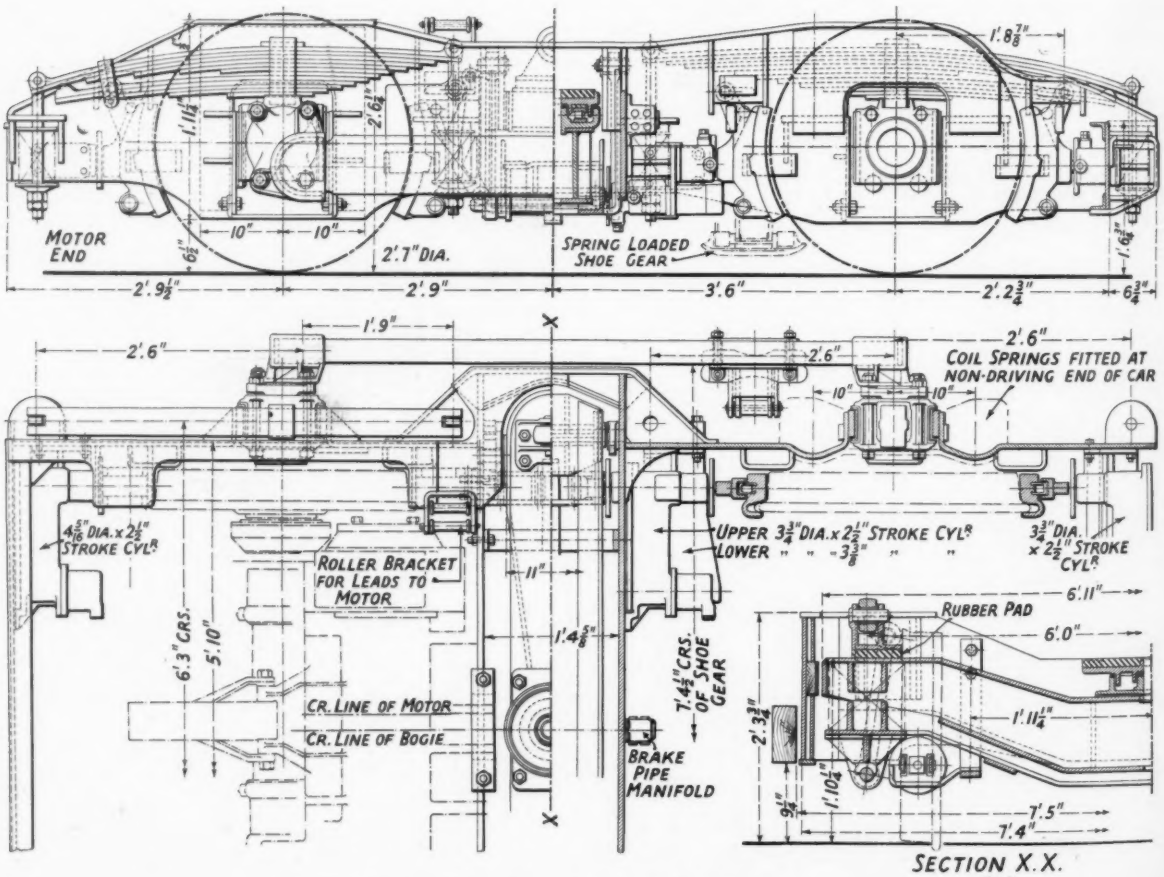
All cars are fitted with two double and one single air-operated sliding doors on each side; the air motors are controlled electrically from the 50-volt supply. Special gears and wheels with silencing devices have been introduced, and in some cases the interior of the car sheeting is sprayed with a noise-deadening composition.

The driver's seat is situated in the middle of a semi-circular cab with a joy-stick controller handle projecting through the floor to the right hand side of the seat. On the left hand side is the driver's brake valve handle, and the other auxiliary controls are within easy reach. Three automatic windscreen wipers provide clear vision in rainy weather.

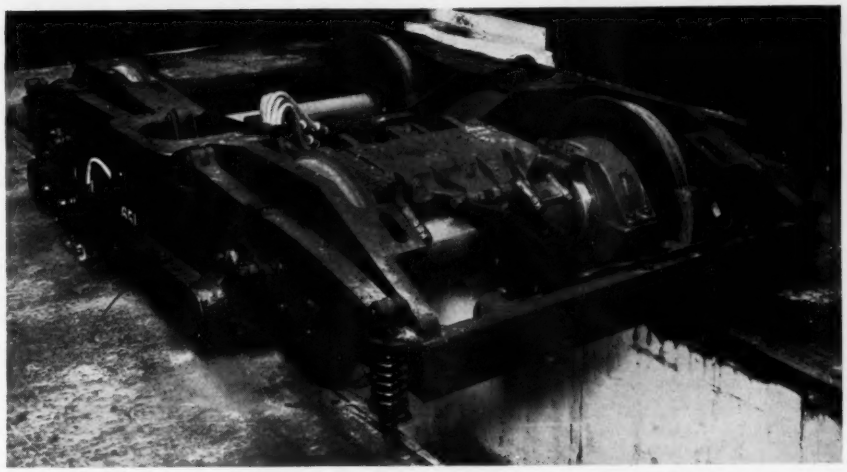
Automatic couplers are provided at the outer ends of


ONE HOUR RATING 138 H.P. 200 AMPS 575 VOLTS 110°C RISE BY R.T.
CONTINUOUS " 97 H.P. 140 AMPS 575 VOLTS 105°C RISE BY R.T.
GEAR RATIO 59/18 = 3.28 WHEEL DIAM. 30" R.P.M. = M.P.H. x 34.7
MOTOR RATED AT ARMATURE SHAFT ON 60% FIELD
MAX TEST SPEED
HORSE POWER
EFF. THRO' GEAR
SPEED
TRACTIVE EFFORT
35% FIELD
52% FIELD
100% FIELD
EFFICIENCY PER CENT
M.P.H.
H.P.
LB. TRACTIVE EFFORT AT TREAD OF WHEEL
AMPERES

Characteristic curves of 138 *h.p. Crompton-Parkinson nose-suspended motor for the four new tube trains for the Piccadilly line*



General arrangement of bogie of new L.P.T.B. six-car trains



Bogie of new L.P.T.B. tube train. Each car has two bogies, each with one 138 h.p. d.c. motor of the self-ventilated type

each two-car unit, and the inner ends are semi-permanently coupled together. This allows rapid make-up of trains composed of two, four, six, or eight cars. The automatic couplers are of the Wedglock pattern, made by G. D. Peters & Co. Ltd. and described in THE RAILWAY GAZETTE for February 14, 1936. They effect automatic and simultaneous coupling of the mechanical, electrical and pneumatic connections. A feature of this coupler is that any wear of the mechanism which may take place is automatically taken up due to the wedge action inherent in the design. The control is electro-pneumatically operated by a push button in the driving cab.

Bogies

The bogies of these new trains have frames of all-welded steel construction with main plates $\frac{1}{2}$ in. thick and main centre transoms $\frac{3}{4}$ in. thick. The transoms and the spring bolster extend sideways beyond the main frame plates which are in two separate lengths down each side. As may be seen from the accompanying arrangement drawing of the bogie, the pivot centre and bolster are not located at the centre of the wheelbase, but at 3 ft. 6 in. from the outer axle and 2 ft. 9 in. from the inner axle. The pivots are of the Timken taper roller bearing type. The traction motor on each bogie is carried on the inner axle, and this arrangement enables 58 per cent. of the car weight to rank as adhesive. The wheels are cast of high-tensile steel, and are of the Kryn & Lahy spoked type.

Various combinations of laminated and helical springs have been adopted on the different trains in order that different suspension theories may be tried out in practice. In the bogie illustrated, the unusual form of the laminated spring system will be noted. The springs themselves are located above Hoffmann roller bearing axleboxes.

Those illustrated are of the Woodhead Multiplex pattern, a feature of which is a great reduction of the reverse camber on the lower portion of the spring, making it more sensitive to track shocks. It will be noticed that at the inner, or flat, end, these springs are of the normal type, but that to the outside, or down-swept, end the Duplex feature is incorporated. Due to the necessity of providing efficient operation at this outer end the Duplex portion has 11 plates compared with 12 at the normal end. Among the other unusual springing arrangements adopted on some of these Underground trains (and all of which were due to the dimensional limitations imposed and the swaying of the trucks) are laminated springs of the normal type but with one end cambered downwards. The large reverse camber, however, tends to stiffen the spring badly as the load increases, hence the development of Woodhead's Multiplex pattern.

Brake Equipment

The brake fitted to these experimental trains is the Westinghouse self-lapping interlocked electro-pneumatic type with retardation control, the piping arrangement of which is shown on the following page.

This system has several features which differ from the standard electro-pneumatic brake previously used. The first is the self-lapping brake valve which is used to control the application and release of the brake. During all graduated applications the usual form of driver's brake valve requires the handle to be moved from application position to holding position, that is, the lap position in

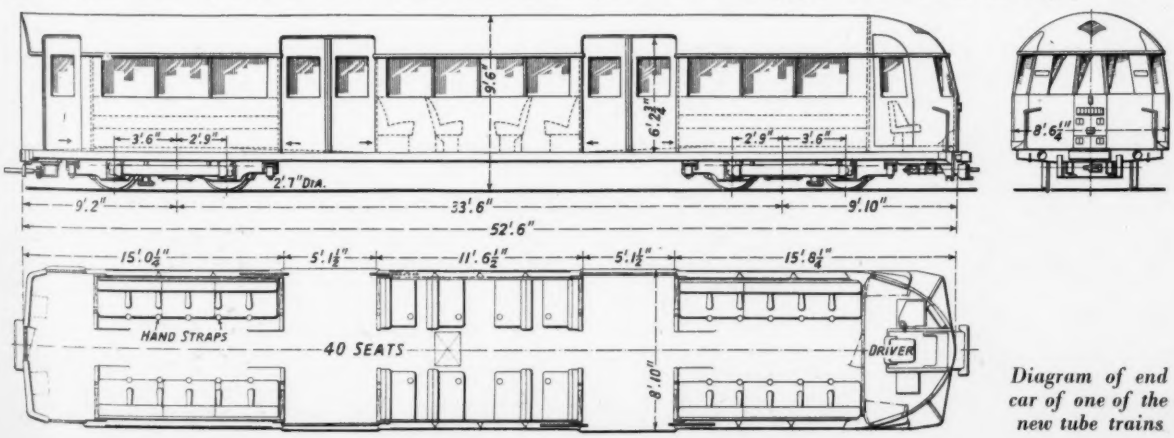
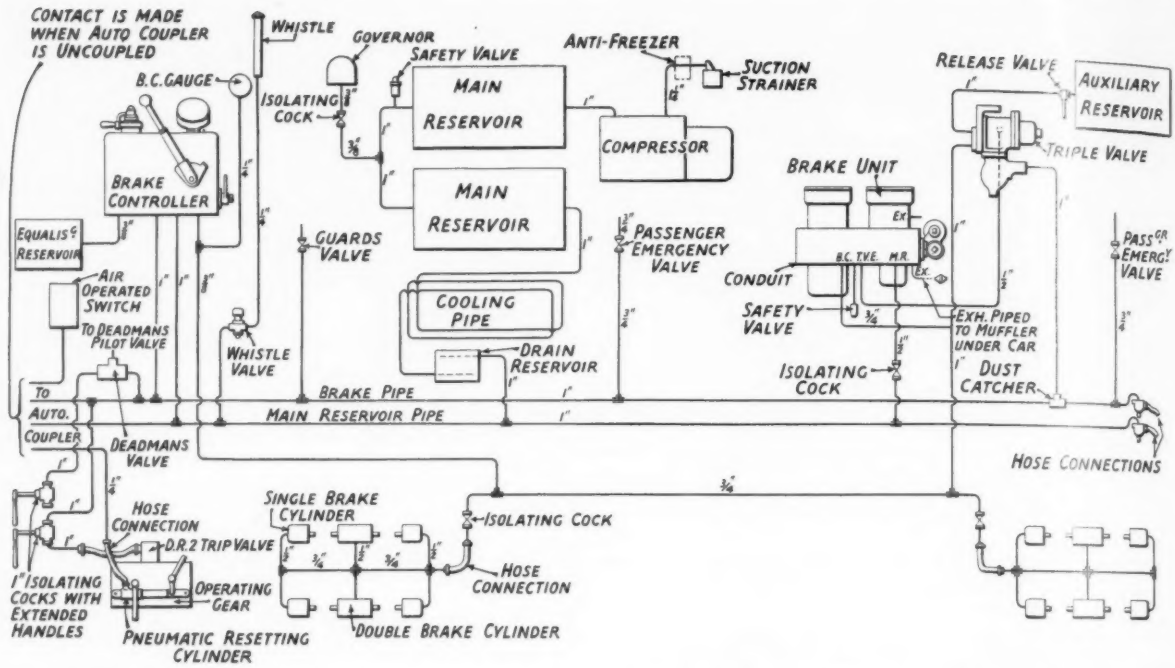


Diagram of end car of one of the new tube trains



Pipe arrangement of Westinghouse electro-pneumatic high speed brake as fitted to the four new tube trains of the L.P.T.B.

which no change in brake cylinder pressure takes place, or, in the case of the graduated release, being moved from release position to holding position. It is therefore not progressive or self-lapping.

The self-lapping brake valve which is used on the new trains provides a form of control in which the brake cylinder pressure corresponds to the position to which the brake valve handle is moved. Amongst its principal characteristics are lightness and sensitivity of control, any desired increase or decrease in brake force being obtained simply by slight movement of the handle.

The retardation controller automatically controls the maximum braking available in two stages. Upon the driver initiating a heavy brake application the retardation rapidly increases until a certain predetermined value is reached. At this stage the retardation controller prevents any further increase in brake force. But the retardation increases, due to the consequent increased friction values at lower speeds, until a higher value has been reached. At this stage the retardation controller reduces the air pressure in the cylinders until the effective retardation comes within safe limits.

Another feature is the brake cylinders which are installed on these tube cars. Instead of the usual system of having one cylinder connected to blocks on all wheels through brake rigging, one small cylinder is provided for each brake block. These cylinders incorporate automatic slack adjusters for taking up the wear of the block and provide a method of applying the load to the wheel blocks which is highly efficient, in that it eliminates losses due to the large number of levers and pins which the usual rigging includes between the brake cylinder and the block.

All these features are super-imposed upon the Westinghouse automatic air brake, which is retained so that emergency braking, in the event of a break-away or any electrical failure, will always be available. A separate pneumatic brake valve is provided so that the automatic brake may be used for service stops in the event of current failure, but the self-lapping E.P. brake valve includes a handle position in which the emergency automatic brake is applied.

The general effect of this system is to give very sensitive control and to provide braking from high speeds at a high rate of retardation, which is not possible by an entirely manually controlled brake.

SUBCONTRACTORS FOR NEW LONDON TRANSPORT TUBE TRAINS

Pneumatic door gear; automatic couplers	G. D. Peters & Co. Ltd.
Springs	J. Woodhead & Sons Ltd.
Asbestos sheets and spraying ..	J. W. Roberts & Co. Ltd.
Special glass	Pilkington Bros. Ltd.
Alpax doors; air duct grilles	Lightalloys Limited.
Ventilating plant	J. Stone & Co. Ltd.; R. Crittall & Co. Ltd.
Traction gears	A. Wiseman & Co. Ltd.; Power Plant Co. Ltd.
Car heaters	Equipment & Engineering Co. Ltd.
Car ventilators and internal window fittings	J. Beresford & Son Ltd.; Percy Lane Limited.
Lighting fittings	Benjamin Electric Limited.
Motor generator sets	Metropolitan-Vickers Electrical Co. Ltd.
Batteries	Young Accumulator Co. Ltd.
Compressors	Electro-Mechanical Brake Co. Ltd.; B. A. Holland Engineering Co. Ltd.
Windscreen wipers	Klaxon Limited.
Brake equipment	Westinghouse Brake & Signal Co. Ltd.
Advertisement frames and drop lights	G. Beaton & Son Ltd.
Bogie pivot roller bearings ..	British Timken Limited.
Driver's loudspeaker equipment	Clifford & Snell Limited.
Multi-point connection boxes ..	Patent Lighting Co. Ltd.
Plywood panels and doors ..	Tucker Armoured Plywood Co. Ltd.
Roller bearing axleboxes and suspension sleeves	Hoffmann Manufacturing Co. Ltd.
Seat springs	Vi-Spring Products Limited.
Moquette	J. Holdsworth & Co. Ltd.
Fire extinguishers	Pyrene Co. Ltd.
Wheel centres	Kryn & Lahy (1928) Limited.